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The NEW ZEALAND JOURNAL OF AGRICULTURE

Vol. 62 WELLINGTON, FEBRUARY 15, 1941. No. 2

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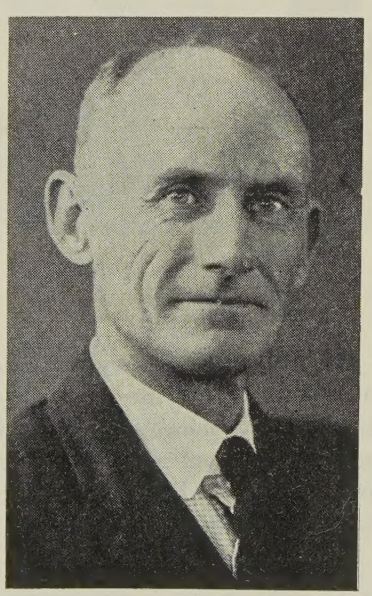
The New Zealand Journal of Agriculture

Published by direction of the Hon. J. G. BARCLAY, Minister of Agriculture.

Vol. 62 WELLINGTON, FEBRUARY 15, 1941. No. 2

Message to Farmers from New Minister of Agriculture

AFTER holding the portfolio of Minister of Agriculture for more than five years, the Hon. W. Lee Martin has resigned from the Ministry because of ill-health, and has been succeeded by the Hon. J. G. Barclay, who has been Member of Parliament for Marsden since 1935. Mr. Barclay is also Minister of Marketing. Following are messages written for the "Journal" by the new Minister and the retiring Minister.



HON. J. G. BARCLAY
Minister of Agriculture.

THE whole of my working life has been spent in farming. I went on the land straight from school, and with the exception of three years at the war, I farmed continuously until 1932, when I sold my holding and retired to live in Whangarei.

Ever since my entry into public life many years ago, the welfare of the farming community has been prominent in my thoughts and actions, and now that I have been charged with the two Departments of State most concerned with the production and distribution of our agricultural and pastoral products, I can assure the farmers of the Dominion that they will find in me a most sympathetic friend. Their problems will also be mine, and in a spirit of mutual goodwill we should play an ever-increasing part in the economic and social progress of our country.

To-day we are in the second year of a titanic struggle against a brutal and ruthless enemy which threatens not only our democratic way of life, but our very existence, and in these critical days the farmer has a vital part to play. New Zealand is a substantial supplier of foodstuffs and raw materials to the Mother Country, and in time of war every farm becomes a munition factory.

The response of the farmers to the call for extra production of certain commodities has been excellent, and worthy of the best traditions of our race. It indicates the will to win which will make victory certain.

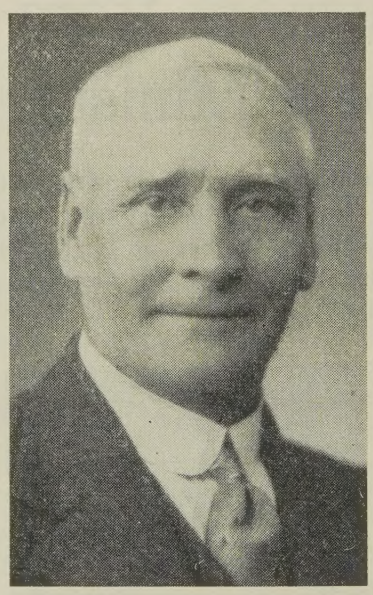
Furthermore, I feel confident that whatever call is made on our farmers, the response will be equal to their very best endeavours, and they can rely on co-operation in every effort they make to meet any situation which may arise.

At the beginning of my term of office as Minister of Agriculture, I want to extend the hand of friendship to each and every farmer. I realise that there are difficult days ahead, and at times some of us may not see eye to eye on certain specific problems, but so long as we place first and foremost the interests of our country and the interests of the British Commonwealth of Nations, we have nothing to fear, and we have before us a future of hope and promise.

To-day our basic resolve is victory for Great Britain and her Allies. Together, let us march to victory.

—J. G. BARCLAY,
Minister of Agriculture.

Message from Retiring Minister of Agriculture



HON. W. LEE MARTIN

ON my retirement as Minister of Agriculture, I wish to express my thanks and gratitude to all those who have co-operated with me in my five years of office.

When I was entrusted by the first Labour Government with the portfolio of Agriculture, I saw before me a very wide field of opportunity, and during my term as a Minister of the Crown I have endeavoured not only to increase the productivity of our soil, but also to advance the welfare of the men and women who have dedicated their lives to the production of all those necessities of life which are wrested from the good earth. There is no more dignified calling and no calling upon which the world is so vitally concerned.

As I hand over the administration to my successor, the Hon. J. G. Barclay, my mind is filled with memories of years—arduous years—spent in a field which has been very close to my heart.

I have enjoyed my term of office. Right or wrong it was always based on my conception of my duty towards my fellow farmers, and, although I am now retiring to a more leisurely way of life, the farming community will still find in me an ardent champion.

I have a profound confidence in the future of our agricultural and pastoral industries. There are problems to be solved—there always will be—but with the knowledge we possess and the knowledge that research will surely yield, there are tremendous possibilities before us.

In the advances to be made the Department of Agriculture will play a vital part. Just at the moment the clouds hang low, but let us remember that when winter comes spring is not far behind.

—W. LEE MARTIN.

The Importance Of Superphosphate

By I. L. ELLIOTT,
Supervisor of Fertiliser Supplies,
Wellington.

In this article the author discusses the advantages and disadvantages of superphosphate and the methods that have been adopted in attempts to overcome these disadvantages. In view of the importance of superphosphate in New Zealand farming and the decision to manufacture silico-superphosphate, it is interesting to note that in a number of other countries there has been a trend away from the use of superphosphate on acid soils.

Methods of Combating Disadvantages On Acid Soils

THE present curtailment of supplies of rock phosphate, temporary though we hope it will be, is nevertheless of sufficient importance to the productivity of New Zealand to warrant some discussion on our main fertiliser—superphosphate—and some of the materials with which it is hoped that present supplies may be made to go further and at the same time maintain production. Although silico-superphosphate is being turned out largely as a war measure, it is probable that some such development would in any case have come to this country. Judging by tendencies in other parts of the world and indications here, the use of this material could be of decided benefit to the farming community, particularly for topdressing many of the acid soils of New Zealand.

Since the epoch-making work of Liebig and later of Lawes in 1842, when rock phosphate was first used for the manufacture of superphosphate, almost 100 years have passed. Essentially the same process initiated then is in use today in the four fertiliser manufacturing companies in New Zealand. From the old method of hand mixing, the modern superphosphate industry has greatly progressed, mainly along the lines of improved industrial technique. Some of these improvements were concerned with the grinding and drying of the raw material, some with the manufacture of the sulphuric acid, and some with the chemical control necessary to produce high quality and uniform material.

Improved Product

There can be no doubt that most countries in the world are today obtaining a far better superphosphate than that produced even a few years ago. This is particularly so in New Zealand. In grade, in storage ability, in freedom from caking, and in ease of distribution, there is outstanding evidence of an improved material. In spite of all these factors it is interesting to ask ourselves, "In what respects does superphosphate as a fertiliser suffer from disadvantages, and what appear to be the main directions in which fertiliser use is proceeding overseas?"

As for the disadvantages from which superphosphate suffers, these can briefly be stated as variation in particle size, difficulty in obtaining

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satisfactory distribution through machinery, caking, the rotting of the bag after any length of time in storage, and the facts that rock phosphates containing iron and alumina react to the detriment of the final product and that the water-soluble phosphoric acid tends to become unavailable in acid-fixing soils.

In the past it has been generally accepted that as the phosphoric acid of superphosphate exists in the water-soluble form this must constitute a definite advantage over other forms of phosphatic fertiliser. It is safe to say that the time has now arrived when this statement must be critically reviewed.

A Big Problem

There are in many of the soils of New Zealand elements which cause the phosphoric acid or plant food of superphosphate to go into a form in which it is no longer available to the plant. To quote an overseas authority, "the quantity of phosphoric acid absorbed by the plant during the first year seldom exceeds 40 to 50 per cent. of the total quantity used and may be as low as 15 to 25 per cent." It is not an exaggeration to say that one of the greatest fertiliser problems of today is to increase the proportion of the phosphoric acid recovered by the plant.

There are in general two approaches to this question. The first is a change in the physical form in which fertiliser is presented to the consumer. The second is by the method of converting the water-soluble acid into a form in which it can readily be taken up by plants and not converted into undesirable compounds by elements present in the soil.

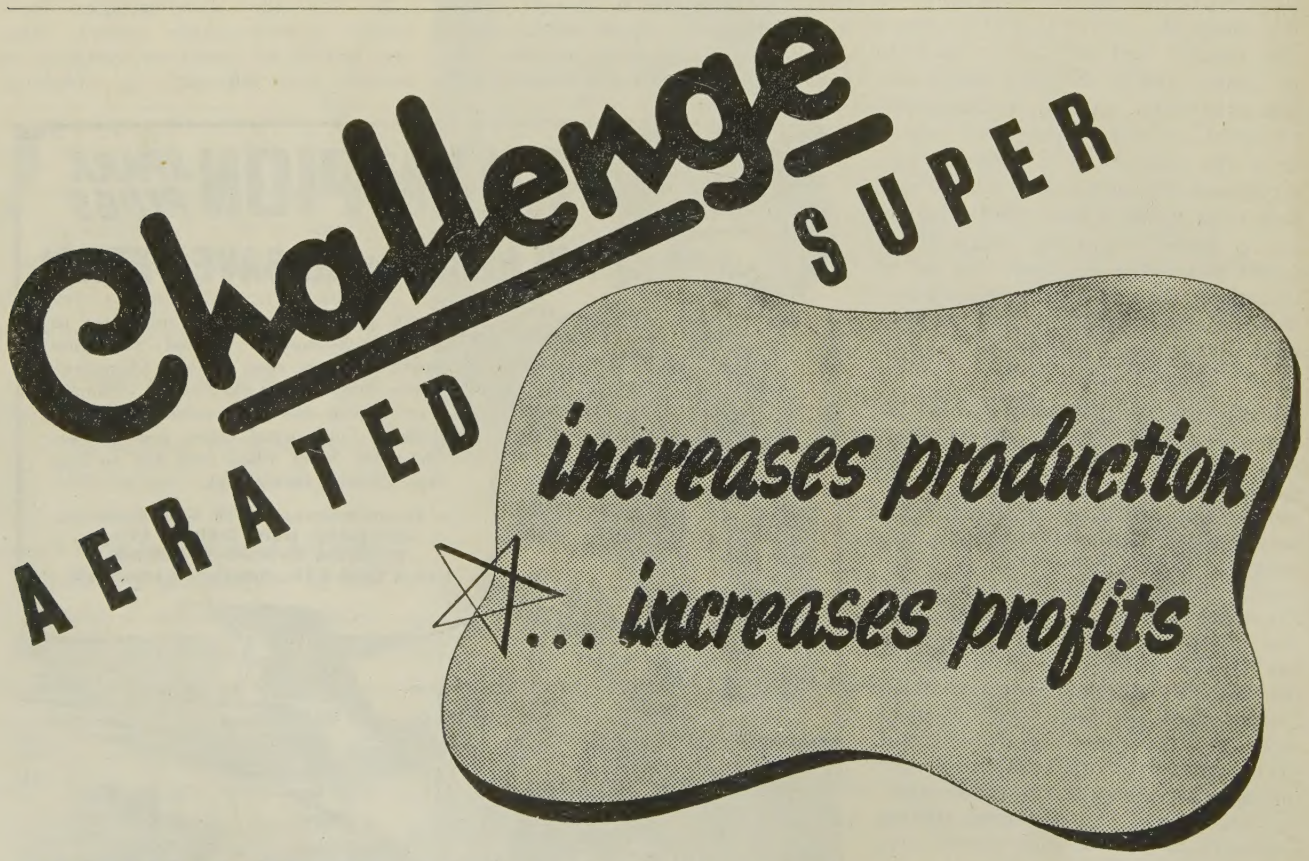
The first of these methods, which has commonly become known as "granulation," has been chiefly exploited in the United States, where the Oberphos process, in which decomposition is effected in an autoclave, produces a granulated superphosphate. The significance of granulation has not yet become fully known, but certain it is that a much-improved product has been developed. It is a definite advance so far as ease of spreading is concerned, particularly where applications are made by hand.

From the point of view of the amount of plant food released and taken up by plants, there is considerable evidence to indicate that in this respect, too, it is superior to superphosphate. The reason advanced for this is that the soil in immediate contact with the particles becomes saturated with readily available plant foods which are only partially converted into a form which cannot be used by plants. This, then, is one of the approaches to the problem of increasing the proportion of phosphoric acid added to the soil and recovered by the plant.

In New Zealand most of the superphosphate manufacturers are producing some type of granulated superphosphate, which may be purchased under various trade names.

Making of Silico-Super

The second method of approach to the problem, as previously indicated, is by effecting a chemical change in the



superphosphate itself. Notably in Europe and the United States the endeavour has been made to produce phosphate whose plant food content is readily available to plants by means of direct action on rock phosphate without the intermediate steps of superphosphate manufacture. Most of the methods have had for their central principle the application of heat in conjunction with silicic acid and water vapour. So far results on a commercial scale have not been really encouraging, but there is hope that technical difficulties may be overcome in the future.

After this very brief review of development overseas away from the use of ordinary superphosphate on acid soils, it is both interesting and profitable to review developments in our own country. Even a glance at the figures of fertiliser applied in New Zealand shows that pride of place is given to superphosphate.

In the South Island, however, it is interesting to note the expanding use of basic or reverted superphosphate. The mixing of superphosphate and about 15 per cent. of lime has the effect of producing a phosphatic fertiliser whose water-soluble phosphoric acid is converted to a form not soluble in water but available to plants. This, then, represents a distinct departure from the usual New Zealand practice and shows a tendency to fall into line with overseas developments away from straight superphosphate.

A second departure of great interest is the proposal in the North Island to manufacture silico-superphosphate on a large scale. This material is made by a hot mix of ground serpentine rock with superphosphate—three parts of superphosphate being used to one part of ground serpentine. The chemical process involved is the formation, with the magnesium oxide present in the serpentine to the extent of about 35 per cent., of a compound whose phosphoric acid is converted to the non-water-soluble form.

New Women's Section

All manner of things which appeal to women will be found in the new Women's Section, "The Good Neighbour," at the back of the "Journal." Here are some items in this month's issue: Care of Silk Stockings, Beauty Hints, Book Review, Household Hints, Tasty Recipes, Short Story, and Competitions.

World-wide Trend

Both these departures, then, are mainly of interest in that they portray a tendency to develop fertilisers from which it is hoped a higher proportion of the phosphoric acid added to the soil will be recovered by the plant. Judging by results abroad, it seems that these developments are not temporary measures to expand present inadequate supplies of superphosphate, but represent New Zealand's contribution to a definite world-wide trend away from the use of superphosphate on acid soils.

It must be remembered that superphosphate has given wonderful results in New Zealand, and it is not suggested that at the present state of our knowledge any great departure from its use should be made. It has rather been the purpose of this article to indicate that, undoubtedly useful as superphosphate has proved itself, it still suffers from some drawbacks and that developments are afoot in New Zealand and elsewhere to improve the already high efficiency of this fertiliser.

The concluding paragraph of an article which has been freely drawn upon—"Possible Development of the Superphosphate Industry," appearing in the "Chemical Age" of March, 1940—is of such interest that it appears well worth reproducing.

"That there should be more intimate co-operation and collaboration between manufacturers and agricultural chemists, experimental stations and farmers, is evident, and we wish to give renewed emphasis to this view. The ideas of the customer should be sought and an endeavour made to meet his requirements, however vaguely and indefinitely these may be expressed. Only in this way can a favourable development of the superphosphate industry be expected. The manufacture of superphosphate was first conceived by the greatest agricultural chemist of his time, Liebig, and it is felt that the superphosphate manufacturer, having concentrated his interest during the last hundred years mainly on the economic, mechanical, and chemical aspects of the process of manufacture, should now devote some attention to the insistent task of agricultural research."

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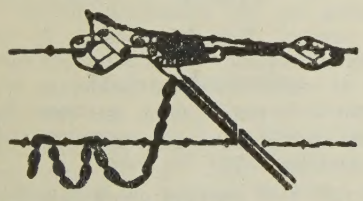

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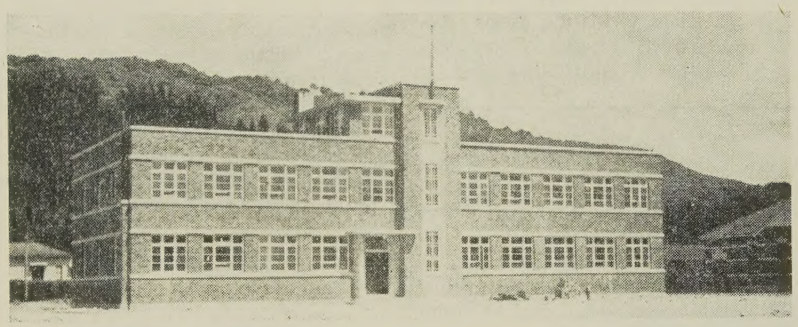
THE Director-General's PAGE



New Animal Research Laboratory

AN important addition to the Animal Research Station at Wallaceville was officially opened by the Prime Minister, Rt. Hon. P. Fraser, on January 17. The new building has been designed and equipped on modern lines, and will relieve the congestion which has hampered the work at Wallaceville for some time past.

The old buildings at the Station are being used for diagnostic work, and the laboratories of the new building have been equipped for research work.

The new building, which is of two storeys, has a flat roof, on which are constructed two staff rooms. The ground floor has a kitchen suite for the preparation of media and the sterilisation of glassware, hot and cold rooms, a large post-mortem chamber, offices, and several laboratory rooms. The main space on the ground floor is devoted to nutritional work in its relation to disease of stock. Here, experimental rat colonies are kept, and accommodation is provided for a staff of chemists, who work on various phases of disease problems. An up-to-date photographic studio is a feature of the floor, as photographic records are kept of animals used in experiments. There is also a small library to hold the more valuable journals and text books.

The research station, which has a staff of about 50, is part of the Animal Research Division, Department of Agriculture. It is divided into three main sections—pathological, diagnostic, and nutritional. The pathological side is directed by Dr. C. S. M. Hopkirk, D.V.Sc., who is also officer in charge, and investigates specific animal diseases unconnected with nutrition, such as mastitis, contagious abortion, and pulpy kidney. Specimens sent in from all parts of New Zealand from meat works, veterinarians, and farmers themselves are dealt with by the diagnostic section, which is controlled by Mr. L. W. N. Fitch, B.V.Sc. The nutritional section, which is directed by Dr. I. J. Cunningham, Ph.D., M.Sc., B.V.Sc., carries out work connected with nutrition and disease. A service laboratory for the Dairy Division of the Department, which is in charge of Dr. G. M. Moir, Ph.D., M.Sc., is also maintained at Wallaceville.

Dairy Production

UP till the end of November, climatic conditions, taken over the Dominion as a whole, could hardly have been more favourable for dairying. During December a change started in the north and gradually spread to the south, and supplies of milk and cream to the dairy factories declined rapidly in most districts, although ample feed was available for the cows.

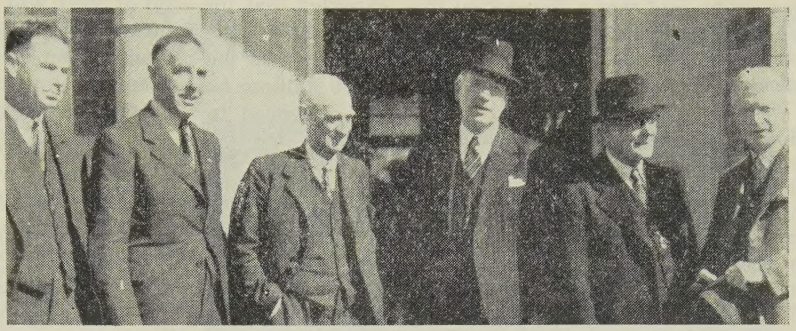
The British Government has indicated its desire that all the milk available should be diverted to cheese-making for the remaining months of the season. For this reason it has become necessary to ask a further number of cream suppliers to change over to the delivery of milk to cheese factories, where more vat accommodation is available since the flush.

A pleasing feature of the change-over has been the high quality of the milk supplied by former cream suppliers. It was expected that, because of lack of cooling facilities, the milk received from these suppliers would not be of as high quality as that received from the older suppliers, but, generally speaking, the quality has been better than expected.

While the supplies of timber for containers for both butter and cheese cannot be said to have eased to any great extent, it may be described as less acute as the result of the seasonal decline in output. It has been necessary to draw upon even the Southland

mills for timber for cheese crates, and in some instances butter boxes and cheese crates which were not thoroughly seasoned have been received at dairy factories as a result of the shortage.

It is already evident that it will be necessary to use an increased number of rimu butter boxes during the coming season, and it has been suggested by those responsible for the supply of containers that it may be necessary to ask dairy companies to accept delivery of quantities of butter boxes and cheese crates in excess of their immediate requirements during the autumn and winter months in order to build up stocks and so ease the position during the flush months of next dairy manufacturing season.



Part of the official group at the opening of the new laboratory. Left to right: Dr. J. F. Filmer, Acting-Director of the Animal Research Division; Dr. C. S. M. Hopkirk, Officer-in-Charge of the Animal Research Station at Wallaceville; Mr. A. H. Cockayne, Director-General of Agriculture; the Prime Minister, Rt. Hon. P. Fraser; Hon. W. Lee Martin, retiring Minister of Agriculture; Mr. H. S. S. Kyle, M.P.

Hogget Mortality

THE first year's research work in connection with hogget mortality has just been completed on the farm leased by the Department at Kirwee, in the Canterbury district. In this work the Department has had the active collaboration of officers of the Canterbury Agricultural College.

Probably because of the dry summer, there was very little hogget mortality in Canterbury this year. None was experienced on the research farm. However, a considerable amount of useful information on the best method of feeding hoggets and ewes during the winter has been accumulated. A new series of experiments into the best methods of feeding hoggets on rape were started in January.

Onion Marketing

IN 1937 the organisation of the marketing of onions was placed under the control of this Department. Although onion growing is a comparatively minor industry in New Zealand, with an average area of under 1,000 acres, onions are an important specialised crop in certain districts, where they provide a great deal of employment.

The objectives of the Department for the benefit of the onion growing industry are:—

(a) To make the Dominion more self-supporting in onion supplies and thus reduce the necessity for expenditure of overseas funds on imported onions.

(b) To eliminate, as far as practicable, alternate gluts and shortages of onions, with the resultant wide fluctuations in the price.

(c) To ensure satisfactory grading of onions for delivery within New Zealand, so that the merchant and consumer are adequately protected.

(d) To develop export trade in onions, and to ensure that only first-grade onions are exported.

(e) To develop better keeping strains of onions, and to foster better cultural practices and improved seed production under Government supervision.

The Department has been greatly assisted in attaining towards these objectives by the Onion Marketing Advisory Committee, which consists of four growers and three merchants, the chairman being Mr. R. B. Tennent, Director of the Fields Division. A great deal of credit must be given to this committee for the success of the marketing regulations and the general development of the industry.

In the past merchants have imported onions from Australia, Japan, Canada, or California to meet the requirements from August to September until January, and the quantity imported during the five years 1935-39 inclusive has averaged over 3,000 tons annually, involving an expenditure of overseas funds averaging over £30,000. In 1939, however, favoured by a very strong market for onions in Sydney, a substantial export of onions was possible, and over 5,000 tons was shipped, this being valued at £74,132. During 1940, it was not possible to secure export orders for onions, and so a policy was adopted of storing suitable bulbs so that New Zealand might be able to carry on during the whole year without importation. This expectation was fulfilled, and for the first time for very many years it has not been necessary to import onions to New Zealand.

Remounts Subsidy

IN order to increase the breeding of horses suitable for saddle purposes the Government brought down regulations in 1938 under which the Remounts Act of 1914 was made operative. This Act provides for the payment of a subsidy to owners of selected and approved stallions to enable the owners to make the stallions available for service at a reasonable fee.

In view of the requirement of horses for camps for mounted rifle training, it will be seen that this provision was of very considerable importance. Already two crops of foals have been produced under the scheme, which is in full operation for a third crop of foals.

Before a subsidy is granted to the owner of a stallion a recommendation from the local Remount Committee is necessary. The horse is then submitted to veterinary examination by officers of the Livestock Division. If the examination proves satisfactory, the recommendation is submitted to the Minister of Agriculture for his decision.

The Remounts Act provides for the payment of an amount up to £4,000 per annum for subsidy purposes. Fortunately, the Department has had the co-operation of other bodies interested in the breeding of light horses, and financial and other assistance has been provided by these bodies to give further encouragement to the scheme.

It may be said that a foundation has been laid to encourage the breeding of a type of horse which was being neglected because of lack of demand for animals of this class.

So far the scheme has been well patronised. In the first year of operations (1938-39 season) 28 remount districts were formed, and 31 stallions were subsidised. It has been estimated that a crop of about 570 foals was produced in this year. In the second year (1939-40 season) 39 stallions were approved for subsidy purposes. It is expected that the crop of foals will be about 700. The returns are not yet complete. In the present season (1940-41) 39 stallions have been recommended and approved for subsidy purposes.

It may be claimed that the scheme has filled a useful purpose, particularly at the present time, and due credit must be given to the assistance given by the New Zealand Racing Conference, the New Zealand Trotting Association, the members of Remount Committees, and others.

Slaughterings of Stock

THE following returns of slaughterings of stock at the meat-export slaughterhouses and abattoirs for the eight months, May-December, 1940, has been compiled by the Livestock Division:—

District	Cattle	Calves	Sheep	Of which Ewes were	Lambs	Swine
North Island						
Meat Export Slaughterhouses—						
Auckland	110,271	583,034	82,246	47,747	433,651	166,175
Poverty Bay - Hawkes Bay	43,249	56,791	132,715	59,532	669,518	15,332
Taranaki-Manawatu	57,189	216,243	71,049	43,438	469,944	91,384
Wairarapa-Wellington	28,083	29,863	66,374	30,934	288,208	20,548
Totals	238,793	885,931	352,384	181,551	1,861,321	293,839
Abattoirs	82,328	26,214	314,206	158,632	48,018	72,749
North Island Totals	321,120	912,145	666,590	340,183	1,909,339	366,588
South Island						
Meat Export Slaughterhouses—						
Nelson-Marlborough	1,254	10,036	26,836	12,303	72,308	5,466
Canterbury	7,835	40,362	233,360	188,139	513,148	19,456
Otago-Southland	6,606	39,452	158,709	132,778	696,714	4,493
Totals	15,695	89,850	418,905	333,400	1,282,170	29,415
Abattoirs	36,015	9,269	170,879	87,051	16,700	30,080
South Island Totals	51,710	99,119	589,784	420,451	1,298,870	59,495
Dominion						
Meat-expt. Slaughterhouses	254,487	975,781	771,289	514,951	3,143,491	323,254
Abattoirs	118,343	35,483	485,085	245,683,	64,718	102,829
Grand Totals	372,830	1,011,264	1,256,374	760,634	3,208,209	426,083
Same Period, 1939— Meat Export Slaughterhouses and Abattoirs	316,346	1,000,986	1,096,832	547,475	3,263,313	328,024
Same Period, 1938— Meat Export Slaughterhouses and Abattoirs	312,587	967,442	1,190,208	625,502	3,048,530	448,295

Slaughterings of Pigs

The 86,859 pigs killed during December were distributed in weight ranges as follows:—

Under 60 lb.	275
60-110 lb.	9,613
111-120 lb.	5,206
121-160 lb.	32,213
161-180 lb.	16,420
Over 180 lb.	3,279
Sundry	19,853

The grading of pork is 93 per cent. primes and 7 per cent. second quality and of bacon 69 per cent., 24 per cent. and 7 per cent. of priime 1's, prime 2's and second quality respectively.

In the different weight ranges of baconers the grading is as follows:—

111-120 lb.	83%, 112%, 5% of P1, P2 and Seconds.
121-160 lb.	72%, 22%, 6% of P1, P2 and Seconds.
16:-180 lb.	61%, 31%, 8% of P1, P2 and Seconds.

N.B.—Because of delay in the reception of returns a larger number of pigs than usual are included under "sundry."

The Fruit Season

IT is expected that the fruit crop for the current season will show a slight decrease on last year. However, as the possibility of export of apples and pears this year is negligible, it is considered that the local market supplies will be in excess of previous seasons.

Military duties have brought about a shortage of labour on fruit farms, and with the advent of the harvesting season growers are experiencing some difficulty in replacing those who have joined the fighting forces. This applies particularly to skilled labour which is required for the grading and packing of fruit.

Fruit packing classes have been held throughout the Dominion during the past few months with a view to having trained packers available for the coming fruit season. These have been well attended, and the pupils have made good progress under the tuition of orchard instructors of the Department, with the result that a list of recommended trainees has been furnished to the head office of the New Zealand Fruitgrowers' Federation for dissemination among growers who will require skilled labour.

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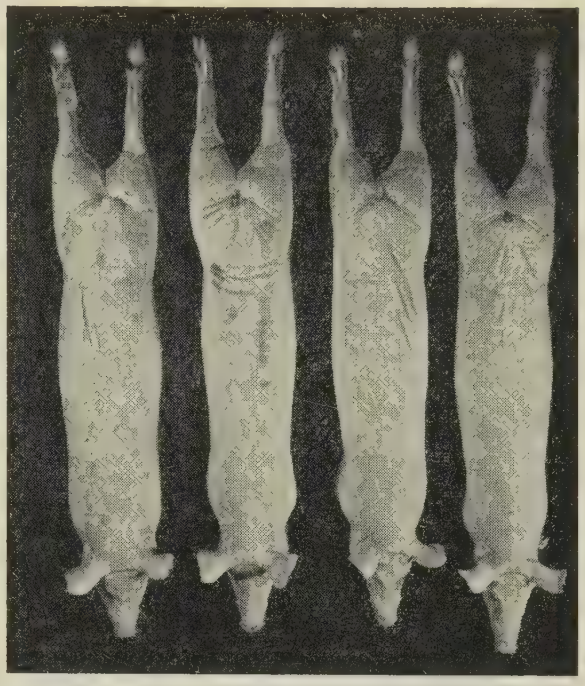
SWINE HUSBANDRY WILL PREVENT THESE DISEASES IN PIGS

★ *It is gratifying to be able to record a decrease in the rejections of pigs killed for export. This decrease is due to better pig husbandry, but further improvement may still be made. The price of achievement is eternal vigilance.*



Pig carcasses damaged by weals and bruises.

WHEN a pig carcass is disfigured by blemish or affected with disease it cannot be exported in the carcass form. Blemishes which cause rejection do not make the carcass unfit for human consumption, but they represent a loss in that the carcass may have to be cut and sold in pieces, whether for export or local consumption, usually at a lower price than a whole carcass. It is gratifying to be able to report a very considerable reduction in reject pigs during the last six or seven years.

No other class of animal responds to good management to the same degree as the pig. Good management entails the provision of adequate feed supply; it means the provision of hygienic surroundings; it means regular attention and planning in advance; it means the spending of capital in pigs. On the many farms where better facilities have already been provided for pigs, where overcrowding and insanitary conditions are eliminated, where extremes of heat and cold are avoided, rejections at the works have been considerably reduced.

Usually, good accommodation is associated with keen owner interest and attention to detail. Improved facilities for storing milk and better ways of feeding it, and the carrying out of such necessary operations as castration, ringing and detusking at the proper time and in a clean and proper manner are the consequences of this, and a further reduction in disease and rejects, the final result. All this may be properly described as being within the sphere of good management.

Improvement Shown

The following table is a very creditable indication of the improvement which has taken place in recent years in the health of pigs as reflected in the amount of blemishes and disease seen at the various works and abattoirs throughout the country. The works and abattoirs from which these returns were obtained varied from year to year; hence, although all the percentages are comparable, the actual totals are not. The table covers the incidence

Contributed by the LIVESTOCK DIVISION

of disease of a limited nature which requires the rejection of carcasses for export.

The list below does not refer to pigs wholly condemned at the various works and abattoirs because of disease It may, however, be taken as some indication of the incidence of disease in general in the pigs sent forward for slaughter from the farms. The decrease in the incidence of disease throughout the years is very pleasing, and the

Slaughtering Seasons, ending September 30.

Cause of Rejection.	1935-36.	1936-37.	1937-38.	1938-39.	1939-40.
Pleurisy	50,963 5.55%	55,836 5.73%	39,899 4.22%	28,863 3.56%	13,591 1.98%
Peritonitis	8,619 .94%	9,711 1.0%	5,343 .56%	2,343 .29%	886 .13%
Abscess	10.372 1.-3%	10,859 1.11%	9,822 1.04%	8,391 11.04%	6,473 .94%
Faulty Castration	2,988 .32%	4,168 .43%	3,943 .42%	2,354 .29%	1,200 .18%
Arthritis	3 972 .43%	5.058 .52%	4,332 .46%	4,311 .53%	3,105 .45%
Skin Disease ..	2,397 .26%	1,737 .18%	1,689 .18%	1.406 .17%	679 .10%
Wounds and Bruises	5,022 .55%	6,971 .71%	7,771 .82%	6,289 .78%	4,760 .70%
Other Causes ..	7,481 .81%	6,575 .68%	4,754 .50%	3,334 .41%	2,088 .3%
Total Pigs found diseased	127.901 or 13.85%	112,841 or 11.53%	85.641 or 9.06%	61,420 or 7.58%	33,306 or 4.86%
Total Pigs inspected	918,697	974,027	945,691	809,5598	685,036

pig producers of the Dominion deserve due credit for the improvement they have effected.

It will be noted that there was a considerable decrease over the period in the total number of pigs inspected. The decrease in disease may be due to the elimination of the careless pig raiser, and to some extent possibly to the desire at the present time to export as great a quantity of baconers as possible. Whatever argument is put forward, however, it is apparent that the pig farmers who produced the 685,000 pigs last season deserve credit for sending in pigs in which the incidence of disease was much lower than that seen a few years ago.

Pleurisy

Dealing with the various diseases tabulated above, the reduction in pleurisy from 5.55 per cent. to under 2 per cent. is very satisfactory, as this was the major cause of pigs failing to pass for export. This reduction is a reflection of the improved housing and drainage which has lessened the incidence of pleurisy on the farm. The avoidance of extremes of temperature, the prevention of overcrowding by the greater subdivision of fattening pens, and the better general management of the sow and litter all tend to reduce pleurisy in the pig. It is generally accepted that the non-fatal types of pleurisy which are the cause of the adhesions seen at the killing works are contracted in the early life of the young pig at or about weaning time, so that a system of young pig management which takes care of the health of the pigs at this age is of the utmost importance.

The improvement in housing and drainage, the use of the creep system of feeding, and the extension of the use of supplementary feeds to the dairy by-products in the rearing of litters are the major factors which have contributed to the very satisfactory advance made. This may be summed up in a higher standard of pig management or pig husbandry.

There is a tendency for non-fatal pleurisy to improve with the age of the pig, so that the fact that more baconers than porkers have been sent forward in the last year or two may have contributed also to the better position.

Peritonitis

There is also a very pleasing reduction of peritonitis from .94 per cent. to .13 per cent. in the period covered. Like pleurisy, peritonitis is a reflection on the general incidence of infection in and around piggeries. Peritonitis may be set up from an extension of infection from the stomach or bowel in cases of inflammation in the digestive tract. Inflammation in the digestive tract may be traced back to irregular or wrongful feeding, to insanitary feeding conditions and surroundings, to infective organisms of the suipestifer or pasteurella group, or to worms or any digestive upset. A sudden change of feed will bring on digestive trouble

Young weaner pigs or purchased pigs should be allowed some time to become accustomed to a new system of feeding, and all changes in feeding should be brought about gradually. In grain feeding districts it may be necessary to provide molasses in water to ensure a laxative diet. In the dairying districts, if green feed is not available

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during the summer or autumn, some molasses may again prove necessary.

Here, again, one comes back to the question of pig management and attention to detail in the feeding of the pigs, the sanitation and drainage of the pig section, and the isolation of newly-purchased pigs to prevent the introduction of disease.

Peritonitis may be due to an extension of infection from an abscess formed after castration or from such accidents as rupture. Cleanliness at the time of castration of the young pigs is therefore of considerable importance.

Abscesses

The incidence of abscess in pigs in various parts of the body may not be seen until the animal is opened up after slaughter. It is frequently difficult to account for many of the abscesses seen in the abdominal cavity. Abscesses of a non-specific type are also frequently seen about the head and neck during inspection of the carcass. Abscesses are also seen in the scrotal region, and apparently result from infection being locked up at the time of castration. A reduction of these abscesses over the period indicates that greater attention has been paid to castrating in a clean and careful manner. Further improvement in the reduction of abscesses as a cause of trouble in inspection should result from handling pigs in cleaner, better-drained sections and houses.

The incidence of arthritis has remained about the same over the period of review. As it is very difficult to determine the exact cause of arthritis in many cases in pigs, it is equally difficult to suggest remedial measures. There is no doubt that several factors influence the incidence of diseases of the joints, such as infection, injury, and nutritional or deficiency causes.

Skin Diseases

Under the heading of skin disease must be included all forms of dermatitis, such as rashes, acute sunburn, urticaria, the after-effects of an attack of mange, sores and abscesses due to injury or barbed-wire cuts, and the so-called necrotic or spirochaetal ulcers. It must be remembered that the pig is not skinned in the process of dressing, and that whether used as a porker or a baconer the value of a carcass is much improved when the skin is clean and white and free from all blemishes. Any blemishes, however small, tend to detract from the appearance of the carcass either for local consumption or for export.

Pigs running on clover pasture during the finishing-off stage of fattening are liable to be affected with urticaria at the time of slaughter. All wounds should be kept clean, and a dressing of Stockholm tar applied until healing takes place. All necrotic or spirochaetal ulcers should be scrubbed and dressed with powdered antimony tartrate and properly healed before the pigs are sent forward for slaughter. The provision of sun shelters is necessary where pigs are subject to sunburn. The periodic oiling of pigs will eradicate lice and prevent much skin irritation and rubbing on posts and wires.

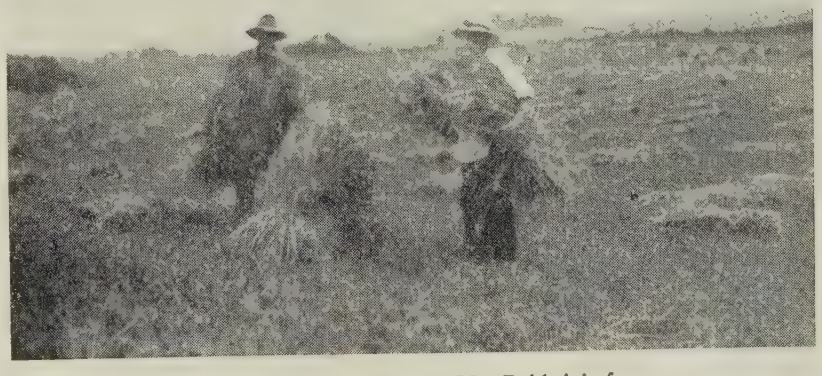
Weals and Bruises

The prevalence of superficial weals and bruises in pigs has not been reduced during the period—in fact, the position is now worse than it was in 1935-36. This heading mainly refers to the more recent type of injury to the animal caused through rough and careless handling immediately before slaughter. A certain amount of fighting among pigs takes place in the trucks, especially if pigs of different sizes are loaded in the same truck. A stag included with other prime pigs may do considerable damage in the truck.

There is also the question of careless handling on the farm, at the loading banks, or at the works, as a result of which too many weals and whip marks are later apparent. The marks may appear harmless to the carrier, but it is surprising how the weals show up when the carcass has been scalded and dressed. There is room for a very material improvement in the general handling of the pig on the way to slaughter.

It is gratifying to be able to record a decrease in the rejections of pigs killed for export. This decrease is due to better pig husbandry. Further improvement may still be made. The price of achievement is eternal vigilance.

How a Putaruru Farmer Uses Home-grown Barley for His Pigs



Harvesting a barley crop on Mr. Baldwin's farm.

HOME-GROWN foodstuffs for bacon production have been fully exploited by Mr. R. Baldwin, a member of the Putaruru Young Farmers' Club and a past chairman, whose performance is worthy of mention. Although not an outstanding record, it has plainly good merit in that more than

— By —
C. S. DALGLIESH,
Fields Instructor, Rotorua.

4 tons of pig-meat have been produced from home-grown foodstuffs plus the

cost of £4 11s 6d for two 44-gallon drums of molasses.

The season was started with seven sows, which Mr. Baldwin found was insufficient for the dairy herd of 75 cows, and had he had the full equipment of sows at the start of the season the performance would indeed have been better. Mr. Baldwin works on his father's farm, "Charlton," Lichfield Road, Putaruru, and is in full charge of the pigs.

During the winter the larger-sized pigs and dry sows are grazed on the swede crop along with dry stock, with access to good pastures. Movable styes are provided for housing. Soaked barley is fed once a day at rate of ¾ lb. to 1 lb. per pig. Old 12-gallon cream cans are used for soaking the barley. After the can is three parts filled with barley boiling water is added, and the feed is used after soaking for 24 hours.

In addition to the available milk supply weaner pigs are fed with molasses and barley-meal soaked in cold water in a 40-gallon drum, and similar to store pigs, have access to pastures. The first stores for fattening are brought into the fattening sty at the beginning of the milking season (early August) and fed three times per day on milk rations plus barley-meal. If the milk supply is not plentiful molasses are used to supplement the shortage.

Here are details of the farm:—

Dairy herd of 75 cows. Pig transactions 1-4-39 to 31-3-40. Pigs on hand 1-4-39: 24 stores, 20 weaners, 12 slips, 7 sows, 1 boar.

Sales.

	Pig-meat. Number.		Weight. Lb.
April	4	baconers	412
April	4	,,	443
May	8	porkers	586
May	6	baconers	662
June	1		35*
June	3	baconers	450†
September ..	7	,,	1,049
October ..	6	,,	857
November ..	6	,,	887
December ..	5	,,	716
January ..	5	,,	830
February ..	8	,,	1,146
March	1	chopper	251
March	6	baconers	875
Total ..	70		9,199lb.

Purchases.

13 Pigs	£26	0	0
10 Pigs	12	10	0
1 Sow	2	0	0
1 Boar	3	3	0

Pigs on hand 31/3/40: 21 stores, 12 weaners, 6 slips, 8 sows, 1 boar.

* Used for home consumption.

† As stores brought into fattening stye mid-August.

Mr. Baldwin has been growing Chevalier barley successfully for several years, using home-grown seed. The barley is generally sown following the swede crop at rate of 2½ bushels per acre, or 3 bushels per acre if sowing is delayed. The average yields of the crops are 47 to 50 bushels per acre, and 90 sacks (2¾ bushel sacks) are generally kept each year for pig feed. The crop is stacked at harvesting, and at threshing the straw is baled and then used for feeding to dry stock when on swedes in the winter.

The barley is ground by a grinder, driven by a 22 h.p. truck engine at rate of four to five bags per hour. Mr. Baldwin considers that the engine power and grinding plant are unnecessarily large for his requirements and that a smaller plant would be quite satisfactory.

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Economic Topdressing of Steep Hill Country

Typical steep hill country.

How Pasture Improvement Can Be Made Less Costly

By W. T. BROWN,
Fields Instructor, Taumarunui.

THERE are many thousands of acres of hill country in the centre of the North Island which are not topdressed, thousands more which receive intermittent dressings, and a small area which, if topdressed annually, responds well and gives a good return for the money spent on this work. Although many of these annually topdressed farms are today profitable concerns, there are many others on which the initial topdressings were made and the owners, seeing little response, discontinued the work. It is in these early topdressings, from which the return is small, that great savings can be made and pasture improvement made less costly.

Kinds of Fertilisers

Practically all hill country responds to dressings of phosphatic manure. However, the farmer must consider how often he is willing to topdress and what area he can reasonably afford to do.

If rock phosphate, guano, or other slow-acting fertiliser is used, heavy dressings of 4 to 7cwt. per acre are required every two to four years. Where this method is used, however, it will take a great deal longer to strengthen the pasture, and pastures will never reach the high state of production acquired by annual applications of the quicker-acting phosphates.

The more common practice is to use superphosphate or some other readily available phosphatic fertiliser annually. In trials, superphosphate has proved superior on all hill country soil types in this district.

Another method is to mix superphosphate and Nauru phosphate, the idea being to get an improvement in the first year from the more available phosphate in the superphosphate, and a sustaining effect over the second year from the Nauru. This practice is quite good, and is better than the application of slower-acting fertilisers alone, but with this manure the pastures should be topdressed every second year.

Clovers

As most farmers with experience of topdressing are aware, the benefit from any fertiliser largely depends upon the amount of clover present in the pasture. Legumes collect nitrogen from the air, and, as available nitrogen and phosphate are both necessary, clover in the pasture is essential. Clovers can make immediate use of phosphatic fertilisers. On the other hand, grasses have no means of collecting atmospheric nitrogen, and are dependent on the clover to liberate quantities of nitrogen into the soil, thus allowing the grasses to make full use of the phosphates.

While all legumes have the power to collect nitrogen from the air, there are certain types, such as white clover, subterranean clover, and strawberry clover, which apparently liberate sufficient to support ryegrass. Of these, white clover is the best, but in areas where white clover does not thrive one of the other clovers may be used. As an indication, strawberry clover will stand saltier soil conditions and subterranean clover drier conditions, and where either of these conditions is prevalent, one of these clovers may be preferable to the white clover.

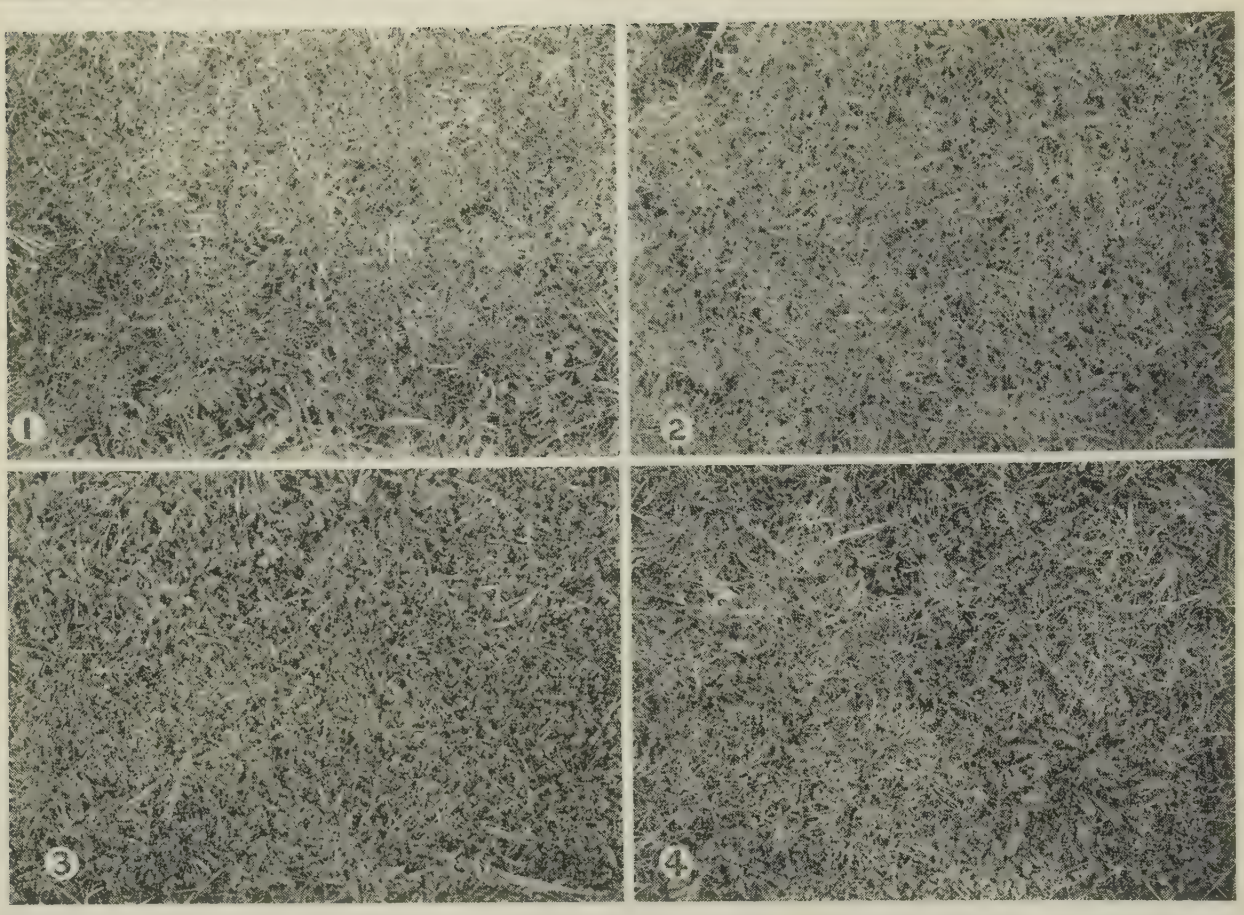

Fig. 1.—Weak pasture with small white clover plants in the bottom of the sward. *Fig. 2.*—Clover improving after one application of fertiliser. *Fig. 3.*—Clover dominant pasture after two applications of fertiliser. *Fig. 4.*—Poor pasture with no clover.

Other clovers, *Lotus major*, suckling clover, and the smaller lotus species all respond well to topdressing, but unfortunately will not support the better grasses, and should be used only where it is obvious that a good pasture cannot be established.

Quantities to Sow

From these remarks of the different clovers it follows that the quantity of fertiliser to be used will be governed by the type and quantity of clover in the sward.

In an untopdressed pasture (Fig. 1) there is usually a little weak white clover in the bottom of the sward, but this is in such a weak state that it can make little use of topdressing, and usually the result of the first dressing is merely to strengthen the clovers. For this reason, it is wise to topdress a pasture of this type very lightly the first year. As hill country has to be topdressed by hand and it is practically impossible to get an even cover with less than 1cwt. of fertiliser per acre, this is the quantity that should be sown.

In the second season following this dressing it will be found that the clover has strengthened, and that a pasture similar to Fig. 1 will most likely have improved until it resembles Fig. 2. A pasture with this quantity of clover present can utilise about 1 to 2cwt.

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Fig. 5.—Lotus major dominant pasture.

[*H. Drake, photos.*

per acre, and with a further application should reach the clover dominant stage as shown in Fig. 3.

In practice, pastures may take up to five years' topdressing to reach this clover dominant stage, but the white clover proportions shown in the illustrations can be used as a guide to the quantities of fertiliser the pasture can use.

When a pasture is similar to Fig. 3, 3cwt. per acre could be used, and it will be found that from this stage the clover will not improve, but that the higher producing grasses—for example, ryegrass, cocksfoot, and paspalum—will increase and gradually suppress a certain amount of the clover, giving a balanced pasture of high-producing grasses and white clover.

If a pasture is to be used purely for sheep and run cattle grazing it is seldom payable to increase topdressing beyond 2cwt. per acre, but if the country is used for dairying 3 to 4cwt. per acre should be applied annually.

It will be easily seen that by this method quite a large amount of material can be saved in the early years of topdressing without retarding either the pasture improvement or the carrying capacity of the land.

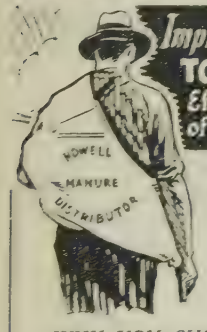
Fig. 4 shows a pasture which is devoid of any clover, and before any improvement can be made this pasture will have to be oversown with white clover. It is interesting to note that this pasture has been topdressed two seasons and has shown no improvement.

Fig. 5 shows how *Lotus major* has increased after two applications of superphosphate, and, although there has been an appreciable improvement, this pasture will never reach maximum production without the addition of white clover.

Time of Sowing

Experimental work and the experience of farmers have proved that the best time to sow fertiliser is in the early autumn. Some prefer two sowings, but as spring sowing merely increases grass in a season when it is most abundant and aggravates the position as far as pasture management is concerned, it is best for farmers to concentrate on autumn topdressing until their farms reach high production, when a spring topdressing can be successfully used to help increase a special purpose grass.

Early autumn topdressing is the most common practice and also the most successful, as pastures topdressed in February-March increase autumn growth, continue growth further into the winter and begin growth earlier in the spring. This practice by giving out-of-season growth at both ends of the winter season increases production, gives a shorter winter, and consequently reduces the quantity of supplementary feed required.



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Deodar Tree Not Suitable For Fence Posts

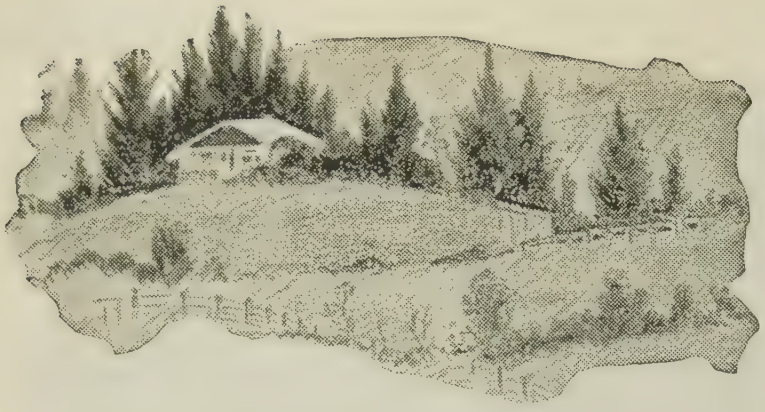
J. F. (GISBORNE):—

There is a very fine old Deodar tree in the grounds, and as the lower limbs are encroaching on other trees, we have had to cut some off. They are thick enough for gate or fence strainer posts. Could you let me know whether you have any data as to their durability in the ground if they were to be used for fencing?

FIELDS DIVISION:—

Grown in the Gisborne climate, it is unlikely that the wood of the Deodar would be suitable for posts. In its native country of India the wood is close-grained, tough, and exceedingly durable, but grows there at a very high altitude.

There is no precise information regarding the durability of this wood in New Zealand, but in England and the South of France it is useless for fencing material, rotting quickly, and being very prone to warping and twisting.



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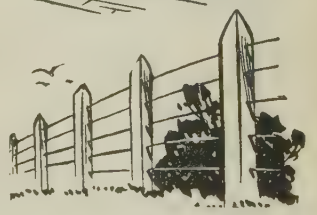

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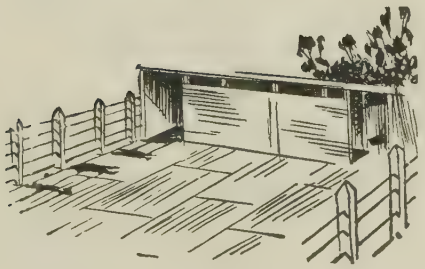

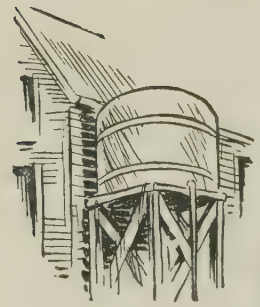

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Concrete on the Farm

Full Description Of How To Use Concrete For Varied Purposes

By J. A. S. MILLER,
Instructor in Agriculture,
Wellington.

Because of its lasting qualities and cleanliness, concrete is becoming increasingly used on the farm. In this first instalment of an article on concrete the author discusses quantities and mixing, and next month goes on to deal with the construction of farm utilities.

ALTHOUGH concrete has been used for hundreds of years as a building material, its application to farming is of comparatively recent origin, and each day we find a new use for this very durable and efficient substance. Its use in the construction of floors, tanks, silos, troughs, fence-posts, paths, buildings, pipes, field drains, etc., is well recognised and there are few farmers who have not at some time laid down a path or constructed a trough from concrete.

The advantages of concrete lie in the fact that it is relatively cheap to use, easy to prepare, and, once placed, is there for years.

Types of Concrete

There are two main types of concrete, namely, plain concrete and reinforced or ferro-concrete. Although plain concrete will resist a considerable crushing force—that is, 600 to 750 lb. per square inch safe load—it will not withstand a bending force of any great dimensions. For instance, unreinforced concrete beams would break because of their own weight with no loading. To overcome this difficulty, concrete requires to be reinforced, and steel, having a tensile strength of about 18,000 lb. per square inch, is ideal for this purpose. A combination of the two, concrete and steel, results in a body of considerable strength, but the steel must be placed in a position where it will take the appropriate strain. **Indiscriminate reinforcing is useless.**

Main Ingredients

Concrete consists of three main ingredients, namely:—

(1) Cement.
(2) Aggregate.
(3) Water.

CEMENT.

There are three varieties of portland cement used in New Zealand, and all three are put up in bags of 124½ lb. net, that is, 18 bags to the ton.

(a) **Normal Portland Cement.**—This is the usual type and is familiar to all.

(b) **Rapid Hardening Portland Cement.**—"Rapid hardening" must be taken literally, not to mean "rapid setting." It takes as long to set as the ordinary variety but, once set, hardens much more rapidly. In a similar mix it is as strong in one week as normal cement would be in four weeks.

(c) **Water-Proofed Portland Cement.**—This cement contains a waterproofing agent which renders it invaluable for cellars, damp-proof walls, etc. Its mixing proportions are the same as for ordinary cement, but it requires slightly longer to set. It has also the property of being little affected by "air setting" while in storage.

All three of the above cements can be mixed at random, that, is, they will blend without any disturbing chemical reaction.

Kinds of Aggregate

Aggregate.—This forms the bulk of the concrete, and is divided into the two main heads:—

(a) Coarse Aggregate.
(b) Fine Aggregate.

Coarse aggregate generally consists of gravel ranging in size from ¼ in. to 3 in. or more, depending on the nature of the work. For walls and similar structures, the ratio of the size of the stones to the thickness of the material can be considered as 1 to 5, that is, for a 5 in. wall the maximum diameter of the stones should not excede 1 in. In plain concrete work such as floors and yards the ratio may be 1 to 3, that is, a 6 in. floor may contain stones up to 2 in. diameter.

In mass concrete work it is not generally economical to try to mix in stones of a greater diameter than 3 in. because of the difficulty of working with shovel or mixer. Sometimes in bulky work where it is desired to save concrete, massive stones or "plums" are

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inserted in newly laid concrete, but these must not be closer together than 2 in., otherwise the strength of the material may be impaired.

Fine aggregate consists of fine, clean sand, and this is required to fill up the spaces between the stones of the coarse aggregate.

Water.—Water used in mixing concrete should be of a standard such as that required for livestock. Where fresh water is unavailable, sea water may be used, but the resulting concrete often shows an efflorescence, and has a "mouldy" appearance.

Amount of Water

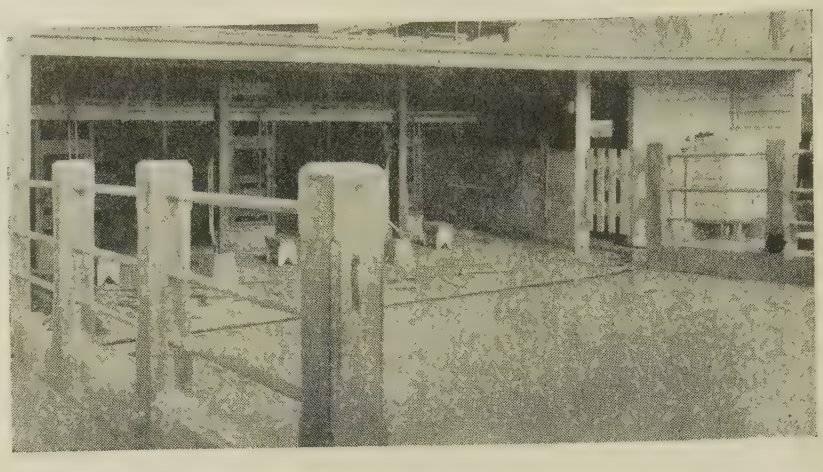
Proportions.—It has been shown that the amount of water used to a given quantity of cement has a direct bearing on the strength of the resulting material, provided, of course, that the consistency of the mix is the same in both cases, that is to say, 1 bag of cement mixed with 6 gallons of water would produce a mix which would be twice as strong as one prepared from 1 bag of cement to 10 gallons of water. It will be understood, of course, that the 6 gallon mixture will not produce as much concrete as the 10 gallon mixture.

For ordinary good concrete such as that required in the construction of paths, cow-yards, floors, and walls, satisfactory results may be obtained by using about 8 gallons of mixing water to each bag of portland cement (124½ lb. net) and then mixing in as much of the aggregate as is required for good consistency. With average ¾ in. aggregate, the above will generally yield about 7 cubic feet of set concrete for each bag of cement used.

Extra Strong Concrete

For extra strong concrete, such as that required for hard-wearing floors, tanks, troughs, etc., or resistance to milk acid attack, a mix of not more than 6 gallons of water to each bag of cement should be used. In this case only about 5 cubic feet of set concrete will be obtained by using ¾ inch aggregate.

These proportions are the limits to which it will be found necessary to go in constructing any type of article such as is likely to be used in farming practices. Fence posts are satisfactorily made from a mix containing 7 gallons of water to each bag of cement.



Properly laid concrete makes an excellent floor for the milking shed.

The following tables give the average quantities of sand and gravel to mix with one bag (124½ lb.) of cement for extra strong and ordinary concrete:—

EXTRA STRONG AND WATERTIGHT CONCRETE.

If material used is graded in size up to:	Quantities to mix with one bag cement and 8 gallons water.		OR Sand and Gravel if already mixed, loose measurement.	Amount of concrete to be expected (approximately)
	Sand, moist, loose measurement.	Gravel (or metal), loose measurement.		
Sand only	4 cubic feet	—	—	3½ cubic feet
⅜in.	2½ cubic feet	4 cubic feet	4½ cubic feet	4½ cubic feet
½in.	2½ cubic feet	4½ cubic feet	4¾ cubic feet	4¾ cubic feet
¾in.	2½ cubic feet	4¾ cubic feet	5 cubic feet	5 cubic feet
1in.	2½ cubic feet	5¼ cubic feet	5⅜ cubic feet	5¼ cubic feet
1½in.	2½ cubic feet	5½ cubic feet	5⅝ cubic feet	5⅜ cubic feet
2in.	2½ cubic feet	5⅝ cubic feet	5⅞ cubic feet	5⅝ cubic feet
3in.	2½ cubic feet	5¾ cubic feet	6 cubic feet	6 cubic feet

ORDINARY GOOD CONCRETE.

If material used is graded in size up to:	Quantities to mix with one bag cement and 6 gallons water.		OR Sand and Gravel if already mixed, loose measurement.	Amount of concrete to be expected (approximately)
	Sand, moist, loose measurement.	Gravel (or metal), loose measurement.		
Sand only	6½ cubic feet	—	—	4¾ cubic feet
⅜in.	4 cubic feet	6 cubic feet	7¼ cubic feet	6¼ cubic feet
½in.	4 cubic feet	6½ cubic feet	7½ cubic feet	6½ cubic feet
¾in.	4 cubic feet	7¼ cubic feet	8 cubic feet	7 cubic feet
1in.	4 cubic feet	7¾ cubic feet	8¼ cubic feet	7¼ cubic feet
1½in.	4 cubic feet	8¼ cubic feet	8¾ cubic feet	7¾ cubic feet
2in.	4 cubic feet	8¼ cubic feet	8¾ cubic feet	8 cubic feet
3in.	4 cubic feet	8¼ cubic feet	9 cubic feet	8¼ cubic feet

The size of the aggregate used will depend on the concrete work on hand, or on the size available.

This table holds good only in cases where "pure" materials are used. The gravel, for instance, is considered to be free from sand. However, in most cases the gravel will be found to contain a certain amount of sand, and the table will have to be adjusted accordingly. This is done by trying out a sample of the proposed mix.

Suppose we have an aggregate of ¾ in. average size which we require to make into ordinary good concrete, a glance at the table shows that we require 7¼ cubic feet of gravel and 4 cubic feet of sand to each bag of cement. On mixing together (without the cement) they should give a total volume of 8 cubic feet. If the result gives a return of more or less than 8 cubic feet, the amount of sand must be adjusted accordingly.

Means of Measurement

Of course it is not necessary to use the cubic foot as a measurement of volume. A tin of, say, one gallon capacity, would be satisfactory, that is, we could mix 7½ tins of gravel with 4 of sand and we should get 8 tins of mixture. The materials used must be moist and should not be compressed into the tins, but put in loosely.

If, on mixing, it is found that the concrete is too stiff to work after the addition of all the water, the amount of water must not be increased—rather the amount of aggregate be reduced, and vice versa, if the concrete is too sloppy, increase the amount of aggregate.

Mixing

A good firm surface such as that obtained by using a wooden platform or a concrete floor is required for hand mixing. Tongued and grooved Oregon is generally used, and a size of about 8 ft. by 6 ft. is required for a one bag mix.

The coarse aggregate should be spread over the platform or floor to a depth of about six inches, the sand spread evenly over this and the cement over the whole surface. The heap should be turned over twice dry, and three times while wetting. The measured quantity of water is usually applied through an ordinary watering can fitted with a rose. There should be no patches of dry material left after the mixing.

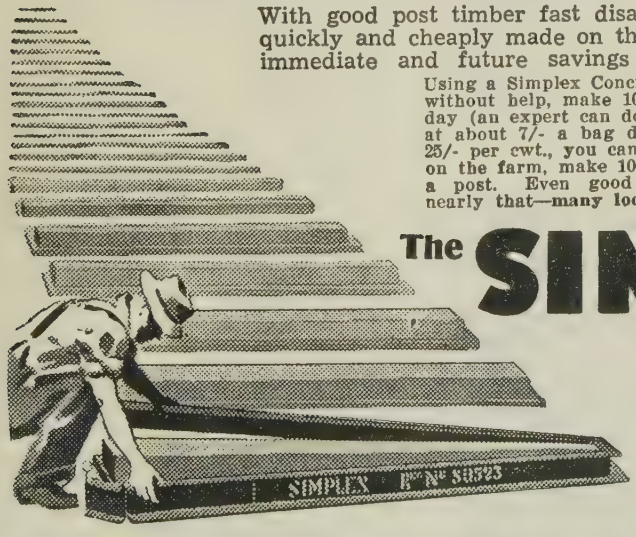
When a mixer is used, the water should be poured into the drum to be followed by half the aggregate, the cement, and then the remainder of the aggregate—all this while the drum is revolving. About two minutes are required to complete the process, but this is the minimum, and more time should be given, if possible, as the longer the concrete is kept mixing the finer will be the resulting material. For larger mixers filled with a hoist, the aggregate is generally placed at the bottom of the hopper to be followed by the cement and then the sand, the whole being deposited in the drum which already contains the mixing water.

Placing

In placing concrete for floors and yards, all that is necessary is to ensure that the material is well compacted. It is generally beaten down with a heavy wooden straight edge, and then smoothed off with a wooden float. The final touch is given when the concrete is losing its glossy appearance (about two hours after placing). For a smooth surface, a steel float is used, and for a rough surface a wooden float, or even a stiff broom is used where a really rough surface is required, as in the case of sloping paths, etc.

Concrete in moulds, as for example those used in the construction of walls, requires compacting in the same manner. As reinforcing will be used in practically every case, a large faced tool or rammer is useless, and a steel rod of 3-8 in. diameter is used. This tool should have a rounded end. Another means of attaining a compacting

1 man (without help) makes 100 "for all time" 6ft posts a day



With good post timber fast disappearing, concrete posts, quickly and cheaply made on the farm, are making both immediate and future savings for far-seeing farmers.

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of the material is that derived from tapping the outside of the boxing with a hammer, but this should be supplementary to the actual ramming.

Curing

Although concrete may appear hard and "set" after a day or so, in actual fact it may take some months to become properly matured. Drying-out of the concrete in an effort to hasten the process is quite a mistake, as concrete actually requires moisture in order to complete the chemical reaction necessary to produce the final substance. This is why it is necessary to protect newly placed concrete from excessive drying-out. Paths and floors should be covered with damp bags for at least seven days with ordinary cement—the longer the period, the better for the concrete.

In walls, the boxing has the effect of protecting the concrete from excessive drying, and should be left on as long as practicable. Warmth also is necessary in the curing of concrete, and the best concrete may be prepared when the temperature of all the ingredients approximates 70 degrees Fahrenheit. Under winter conditions, concrete may take twice as long to mature, and actual freezing of the material in its early stages will entirely ruin it.

As most farmers find time to do their concreting work only during the winter months, they frequently run the risk of having their efforts rendered useless as a result of adverse weather conditions, such as a series of frosts. This difficulty may be overcome to a certain extent by heating the mixing water and using it hot—not boiling. Even moderate warming would be of great assistance, as concrete develops a slight temperature rise after placing which will be maintained provided the material is protected from excessive cold. Straw can be used to considerable advantage in this connection.

There is one useful substance which is of considerable value in hastening the setting of concrete in providing a certain amount of warmth. This is a chemical compound known as calcium chloride, and is not unlike washing soda in appearance. It is comparatively cheap, and not more than 2 1-3 lb. are required for each bag of cement, also it does not injure either the concrete or the steel.

Concrete blocks and moulds. The blocks shown are used for supporting beehives, but may be used for a variety of other purposes.

To use it, a stock solution consisting of 4 2-3 lb. to the gallon of water is made, and half a gallon of this is used as part of the mixing water for every bag of cement used. In very cold weather it may be warmed. It is also used in warm weather to hasten the setting of such articles as fence posts, the moulds of which may be required urgently for other work. However, once out of the moulds, the posts should be given the same treatment as regards retaining the moisture as pertains in cases where calcium chloride is not used as an accellerant.

Vibrating

Vibrating the mould in which concrete is being placed is a new development in the science of manufacture. The idea is that vibration at a fairly high frequency results in a much more even packing of the material. It also enables a mix of stiffer consistency to be used.

The method involved is that of coupling the mould—for example, a gang post mould—to a vibrating medium, such as a stationary oil engine, or to an eccentric of small throw attached to a shaft revolving at high speed.

While this system is highly desirable, it may not always be practicable on a small scale where only a few fence posts are being prepared. However, on farms where there is some live machinery, such as a tractor, there are means by which the vibration of such a machine may be directed towards the reciprocation of the mould, which must be mounted in such a way as to allow free movement.

Several examples of concrete work as applied to the farm are now given. While most farmers have their own ideas of going about the work, the details set out are the result of the experience of men who have specialised in concrete construction. Hence, they arrived at the most economical means of doing the work.

Concrete Paths

Concrete paths are about the simplest of all concrete works, and are usually the first concreting job to be done by amateurs.

There are no special tools required in this work—a good eye is the main thing. Cord lines are used to indicate the direction and to maintain the correct width of the path. Turf and soil are dug out between the lines until a firm foundation is reached. This should be even in depth for its full length, and any necessary levelling should be accomplished by the judicious use of sand or fine gravel, which is also necessary to prevent the concrete from binding to the soil.

Side forms constructed from battens and nailed to pegs driven into the side of the track are necessary to confine the material. At this stage shrinkage definers are introduced at approximately 6 ft. intervals to localise the shrinkage cracks which appear when the concrete has matured. These usually consist of 2½ in. by 3-8 in. laths secured transversely to the side forms at a depth of ½ in. below their surface. The concreting is carried right over them.

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Concrete pig pens are conducive to hygienic conditions, and provide comfortable housing for the pigs.

The concrete mix used should be stiff enough to be beaten flush of the side forms with a timber straight edge of 4 in. by 3 in. This beating should be sufficient to knock down any protruding stones and to work up a fine surface.

When the water glaze is disappearing from the surface the straight edge is again applied to give a rough finish, after which the edges should be bevelled along the side forms. Later on, cover with wet bags, wet straw, or other suitable material and leave covered for about a week.

The mix for this work should consist of 4 cubic feet of sand measured wet and loose, 7¾ cubic feet of 1 in. graded gravel or crushed rock, 1 bag of cement and 8 gallons of water. This will cover approximately 30 square feet.

The cost, exclusive of timber and labour, works out at about 3s a square yard for 3 in. concrete.

Concrete Floors

Concrete floors are constructed in the same way as paths. If small, they may be put down in one piece, but for larger areas, shrinkage definers at 6 ft. intervals (both ways) should be provided.

In cow yards or stables the concrete should be given a slope of ¼ in. to the foot to facilitate drainage. The most desirable way in which to lay large areas of concrete, as in floors, is to do so in strips 6 ft. wide defined laterally by side forms and transversely by shrinkage definers. The scheme is to fill in alternate strips between the side forms and then to fill in the remaining areas when the first portion has set sufficiently to allow tramping. The side forms are, of course, removed before the work is started.

Pugging of the cow race may be overcome by constructing a concrete walk. Although only 18in. wide, this walk has proved highly effective.

The following table gives an indication of the strength of the concrete required for typical paths and floors:

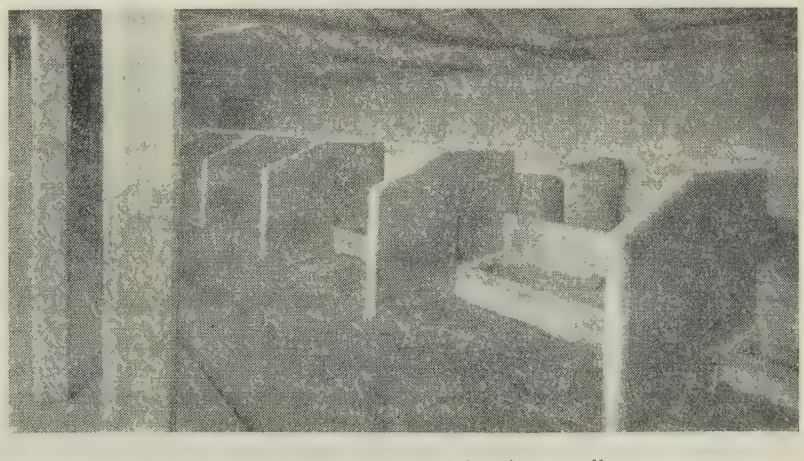
Class of Work.	Thickness in inches.	Quality of Concrete.	Size of gravel in inches.
Light footpaths, dairy and light shed floors	3-4	Ordinary good concrete (see table)	1 or less
Cow yards, heavy shed floors, garage floors	4-6	Ordinary good concrete	1½ or less
Floors, drives, etc., for heavy duty	4-6	Extra strong concrete	1½ or less

An estimate of the area covered by a cubic yard of concrete when the proposed thickness is known is given below:

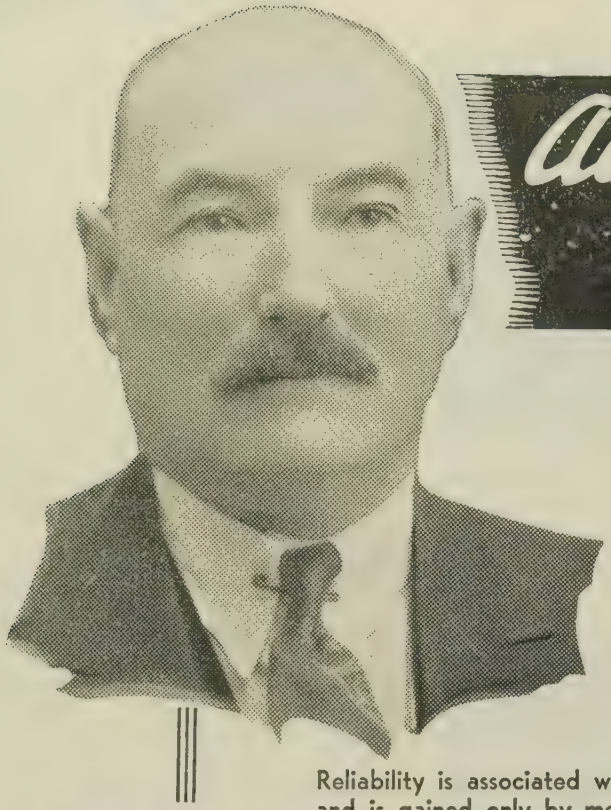
Thickness of concrete in inches	2	3	4	6	8	9	12
Area covered in sq. feet	162	108	81	54	40½	36	27

A final point in laying paths and floors—always finish off the section on which work is being done—that is, fill up to the nearest shrinkage definer if it is impossible to finish the whole job at one time. New concrete does not bond well with older mixes. If there is any prepared concrete left over, use it for foundations or for filling in a depression rather than append it to the finished section, and then continue laying from it the next day.

(To be continued)



How concrete can be used for tie-up stalls.



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Continuing his article in the January issue, the author points out that while soil, climate and topographical conditions must necessarily affect production, it will usually be found that the most important factor is management.

Grasses Play Their Part; But Management Counts Most

By P. S. SYME,
Instructor in Agriculture,
Warkworth.

JUDICIOUS topdressing will do much to pave the way for the introduction and maintenance of ryegrass, but if ryegrass is effectively to replace much of the inferior grasses and rubbish found on second-rate dairying pastures, and if its remarkable capacity for production is to be fully exploited, then the system of grazing management to be followed must also be adapted to the special requirements of the ryegrass.

It should be properly understood that throughout by far the greater part of the typical dairying land of New Zealand the type of pasture to be found on any field will in the long run depend mainly on management, and will owe but little either to good luck or to bad luck. Most of the dairying land is capable of carrying ryegrass, and if the management, like the fertility, is raised to the ryegrass standard, this will ultimately lead to a dominantly ryegrass type of pasture sward.

Leaf Surface Affects Rate of Growth

In the endeavour to encourage speedy growth, attention is very commonly confined to raising the soil fertility by topdressing, on the assumption that the food of the plant is obtained through the roots, and that the rate of growth is therefore entirely a matter of soil fertility. That the plant does obtain much of its food through the root system is obviously true, but it may surprise many to learn that more than half of the material comprising the dry weight of any plant is obtained not through its roots but through its leaves.

Analysis shows that the chief dry matter constituent of plants is carbon. This carbon is obtained from the carbon dioxide in the atmosphere, and the capacity of a plant to absorb it is to some extent proportionate to the area of the leaf which it can present to the sunlight. This obviously means that each time a plant is closely defoliated by grazing, normal growth ceases and cannot possibly recommence until the plant is again able to expose a new leaf surface.

As the majority of grasses have been developed under natural grazing conditions, they have acquired also the ability to transfer food reserves from the roots to form new leaves. This, of course, weakens the root system, but the sacrifice enables the plant to make the necessary fresh growth of green leaf by which it can again absorb carbon and so recommence growth in the normal manner.

It will be obvious, therefore, that persistent close grazing which does not permit sufficient time for recuperation must exert a weakening effect on the plant; and when it is considered that repeated defoliation is, in essence, the very method commonly recommended for destroying many noxious weeds, it will be readily appreciated how quickly faulty grazing can cause deterioration even of the most vigor-

Fig. 6.—An adequate reserve of supplementary feed is indispensible both for the welfare of the stock and of the pastures. The stack shown has been left over from last year, and now forms a welcome reserve for the coming season.

ous pasture. This also helps to explain the baneful effects of persistent overstocking, and why this practice may actually reduce the rate of growth and lead to a vicious circle which penalises both stock and pasture.

A consideration of the foregoing suggests that growth will be speeded up if the routine management of the pasture is designed to enable the plants to develop a fair amount of leaf surface between each successive grazing. If, in addition, the grazing can be rapidly performed and care is taken not to graze too close, the weakening effect of the repeated defoliations on the root system over a period will be reduced to a minimum.

Fig. 7.—Adequate subdivision is essential for high production. If properly planned, such a system provides for the necessary concentration of stock to permit of quick, even grazing, and at the same time allows a sufficient interval for recuperation between successive grazing periods.

Value of Rotational Grazing

In actual farm practice these various requirements can be adequately met only by intensive subdivision and a system of rotational grazing. If properly planned, such a system provides for the necessary concentration of stock to permit of quick, even grazing and at the same time allows a sufficient interval for recuperation between successive grazing periods.

That, in this instance, theory has withstood the exacting test of actual field practice has been the general experience of the majority of those farmers who have gone in for intensive rotational grazing, and it can be definitely asserted that the adoption of this system has been a major factor in the phenomenal increase in production shown in recent years on a wide variety of farms throughout the main dairying districts of New Zealand.

Importance of Generous Food Reserve

While stock may be depended on

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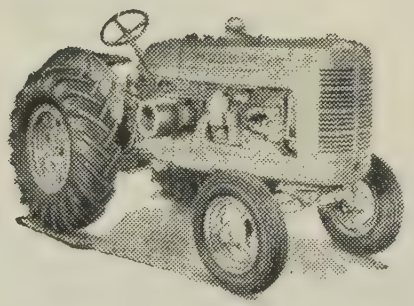

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to provide adequate control of pasture growth throughout the greater part of the year, the natural seasonal production is so ill-balanced during the flush periods as to necessitate the extensive use of the mower. As about two-thirds of the annual growth is normally produced in about one-third of the year, it is evident that a proper balance can be secured only by conserving a generous portion of this surplus for the hungry winter months when growth is at its lowest ebb.

If the winter management of the pastures is to conduce to the building up of a high-producing ryegrass type of sward, an adequate reserve of supplementary feed is highly necessary to permit of lenient winter grazing. For this reason, every effort should be made to conserve the maximum practicable amount of surplus growth either as hay or silage. Fodder in this form, if properly protected, will keep, and even in the heyday of plenty it must not be forgotten that the weather over a period tends to average out normal, so that a season which is abnormally good is quite liable to be succeeded by one which is just abnormally bad.

The effect of cutting for hay or silage, and the transfer of fertility involved when this is fed out, can have an important bearing on the composition of the sward, and this should be kept in mind when planning the general scheme of farm operations.

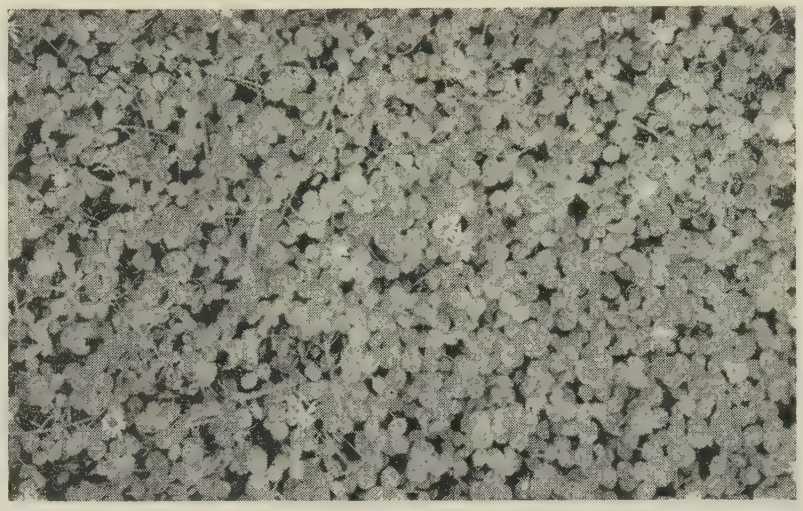


Fig. 8.—**Continuous hard winter grazing tends to penalise the ryegrass and favour the white clover. This is commonly responsible for very clovery swards in the spring, and the condition is often associated with severe trouble from bloat.**

Topping Is Important

As already mentioned, large leaf surface has a bearing on the rate of plant growth. If allowed to grow beyond a certain stage and to produce seed, however, much harm may result. Nature abhors waste, and the ripening process involves the transfer of nutriment from the leaves and stems into the seeds, so that once a pasture has begun to seed the feed quickly becomes tough and fibrous and of lowered nutritive value.

Where paspalum is present in a rye-white clover pasture, topping is sometimes of particular importance. Apart from the food wastage caused by seeding, rank paspalum is somewhat liable to exert a smothering effect on the clovers, and once the clovers are suppressed the fertility quickly falls below the ryegrass level. Although the paspalum itself can still survive, the lowering of the fertility is quickly reflected in the reduced yield, and the tendency is for the pasture to revert ultimately to an almost pure sward of sod-bound paspalum capable of giving only a rather moderate production through the summer and early autumn, and producing a negligible quantity of feed for the remainder of the year.

Under good management, however, considering its length of season and yield, the rye-white clover-paspalum association approaches the limits of perfection.

It should be noted that topping aims at the prevention of seeding, and that once the seed heads have been allowed to develop, the plant makes little further growth, so that topping then loses much of its value.

Fig. 9.—**Efficient topdressing and good grazing management have combined to produce a vigorous and well-balanced sward of ryegrass and white clover.**

Winter Management Can Make or Mar a Sward

Contrary to what one might expect, the treatment which a pasture receives during the dormant winter period has a very important bearing on its productive capacity. Correct management during the winter will work wonders with even a poor sward, and faulty

management at this time will produce a rapid deterioration of even the most perfect sward.

Mention has already been made of the importance of applying the autumn topdressing while the soil is still warm and conditions are still favourable for active growth. This on many farms is an unsuspected critical period, as there is a tendency to graze the pastures too hard because of a natural reluctance to break into the winter feed. Herein lies one of the main advantages of a generous reserve.

Like money, supplementary feed should not be squandered, but also like money, it should not be hoarded. If properly utilised at this period, supplementary feeding can very advantageously reduce the drain on pastures and prevent the very serious over-grazing which results in the pastures being eaten down too close towards the end of the autumn. If grazed too close at this time, recovery is very slow, and the winter growth is almost negligible.

If, however, a number of selected fields can be closed up while growing conditions are still favourable, this flying start enables the pasture to produce an appreciable quantity of valuable winter feed. In utilising this growth, rationing and the free use of hay will enable it to go a surprisingly long way, as the selected fields can each be used in rotation.

The herbage should not be allowed to exceed about eight inches before grazing, and it should not be eaten down below about three inches, so that its recovery and subsequent growth should be as rapid as possible. In addition to providing considerably more winter growth, this lenient controlled grazing results in much quicker spring growth, and yields considerably earlier crops of silage or hay.

Hard Winter Grazing Penalises the Ryegrass

When a pasture is consistently hard grazed during the slow-growing winter months, it is only too obvious that the brunt of this will fall on the ryegrass. The poor winter-growing species will be defoliated only once; grasses such as ryegrass, which do endeavour to make winter growth, will be persistently eaten down right through the winter, and with low temperatures and limited sunlight retarding growth, little opportunity is afforded for recuperation, so that much of the growth which the plant does make is made at the expense of the root system. When a measure of relief comes in the spring, much of the ryegrass is already so enfeebled that it is in no condition to compete with weeds and winter-dormant grasses, which, after their winter rest, can resume vigorous and aggressive growth.

While hard winter grazing punishes the ryegrass, it definitely favours the white clover. Because of its prostrate habit, this clover withstands hard grazing well, and this, by preventing shading and weakening the competing ryegrass, rather tends to encourage white clover growth. For this reason, it is very often found that hard winter grazing combined with generous topdressing results in severe spring bloating. For this, the clover usually acts the part of scapegoat, although, in strict justice, the winter management and the actual method of utilising the clovery sward should also carry their share of the blame.

As lenient, spelled winter grazing tends to favour the ryegrass and hard winter grazing favours the clover, judicious planning of the winter management in this respect can do much to correct any ill-balance. With insufficient clover, the high fertility demanding grasses produce but poorly, while too much clover may result in serious trouble from bloat. Where the clover is becoming too thick, this generally implies that the ryegrass element is becoming correspondingly thin. Because of the rapid increase in the supply of clover nitrogen, the consequent rise in fertility, assisted by a spell of lenient controlled grazing, quickly promotes vigorous grass growth and tends to restore the ryegrass dominance.

Management Matters Most

As farms in general tend to be as distinctly different and individualistic as their owners, it is impossible to prescribe any exact standard of management as suitable for universal application. The experience of many thousands of farmers, however, goes to show that, while soil, climate, and topographical conditions must necessarily affect production in a varying degree, in the long run it will usually be found that the most important factor of all is management.

The farmer counts for more than the farm.

To Farmers' Wives and Daughters

Have you read our new Women's Section — "The Good Neighbour," by Mary — at the back of the "Journal"?

Here are some of the items in this month's issue: Care of Silk Stockings, Beauty Hints, Household Hints, Tasty Recipes, Short Story and Competitions.

Recent experiments at Marton have shown that the commercial samples of both the hard and the soft limestones do not differ significantly in their effect on pasture yields. It has also been demonstrated that it is not necessary to have lime more finely ground than is found in the average commercial lines at present on the market.

Must Limestone Be Finely Ground?

Recent Tests To Discover The Most Effective Types Of Ground Limestone

By A. G. ELLIOTT, Crop Experimentalist, and P. B. LYNCH, Assistant Crop Experimentalist, Fields Division.

THERE are three features of agricultural lime about which the farmer should satisfy himself before arranging purchase. These are:—

(1) The content of calcium carbonate.

(2) The fineness of grinding.

(3) The "hardness" of the rock.

The most important of these factors is, of course, the purity, which is measured by the percentage of calcium carbonate. Good limestones will contain 90 per cent. or more calcium carbonate, while inferior samples will have from 50 to 70 per cent. This factor measures the fundamental worth of the lime, but the importance of the fineness of grinding and the hardness of the rock has, in the past, been less well determined. It has long been recognised that the finer the lime is ground the more rapid is its reaction with the soil and with plant growth.

Limestones also differ in formation. Some are naturally hard and difficult to grind, whereas others are softer, and the opinion has been advanced that the latter type would be more reactive and therefore of greater value than the hard rock. It was to discover the effect on the soil and on pasture production of hard and of soft limestones and of coarse and of finely-ground samples that a mowing trial was laid down at the Marton Experimental Area in 1934. This trial has been in progress for six years, and the results from it are now available for publication.*

Description of The Experiment

The trial was conducted under the mowing and grazing technique† which ensures that the pasture is managed by alternate grazings with sheep and cuttings to measure production so that it does not deteriorate in composition. The plots of each treatment were replicated 18 times.

Samples of herbage from each treatment at each cut were examined by Mr. B. W. Doak, Plant Chemist, Palmerston North, for the determination of dry matter. This figure was obtained by drying the green herbage in a gas oven, grinding, and finally drying it under low pressure at 55deg.C.

Treatments per Acre

1. No treatment.
2. Superphosphate 4cwt. per annum.
3. Superphosphate 4cwt. per annum + Mauriceville commercial ground limestone (hard).
4. Superphosphate 4cwt. per annum + Waikari commercial ground limestone (soft).
5. Superphosphate 4cwt. per annum + Mauriceville coarse ground limestone.
6. Superphosphate 4cwt. per annum + Waikari coarse ground limestone.
7. Superphosphate 4cwt. per annum + Mauriceville fine ground limestone.
8. Superphosphate 4cwt. per annum + Waikari fine ground limestone.

Superphosphate was applied to Treatments 2 to 8 inclusive in two annual applications of 2cwt. each in the summer and autumn. The amounts of ground limestone applied per acre were as follows:—

Treatment.	26/7/34.	18/7/35.	23/7/36.
3	2,240 lb.	336 lb.	784 lb.
4	2,423 lb.	363 lb.	847 lb.
5	2,207 lb.	331 lb.	772 lb.
6	2,392 lb.	359 lb.	857 lb.
7	2,274 lb.	341 lb.	796 lb.
8	2,434 lb.	365 lb.	852 lb.

In all, 1½ tons of ground limestone were applied to Treatment 3 (Mauriceville commercial lime), while the quantities of limestone on the other lime treatments were adjusted to give equivalent amounts of calcium carbonate to this dressing.

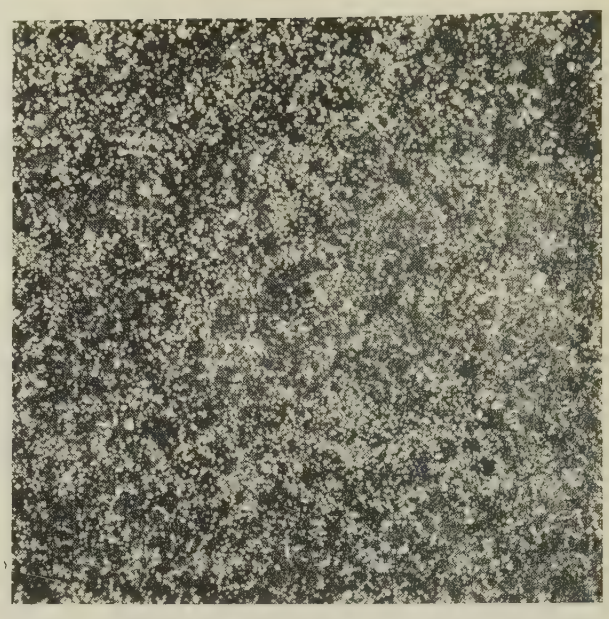
Mauriceville limestone is shelly in character and may be described as "hard," whereas the Waikari material is formed of a soft deposit known as Globigerina ooze. In an experiment on the effect of these limestones when used with superphosphate to reduce germination injury to turnips*, it was found that the former limestone was relatively slow-acting and too uncertain for use in this connection, whereas the Waikari lime was very satisfactory. To separate the "fine" and "coarse" samples, the commercial material was screened on a sieve with 30 meshes to the inch. The portion retained on the sieve was termed the coarse fraction, and that passing was

*A technical paper on this trial will be published in the "N.Z. Journal of Science and Technology." The soil data has been prepared by B. W. Doak, Plant Chemist, Grasslands Division, and the yield figures by the authors.

† Hudson, A. W. Imperial Bureau of Plant Genetics. Herbage Plants: Bulletin 11: 1933.

* Hudson, Woodcock and Doak: N.Z. Journal of Science and Technology: 1937: vol. 18: pages 739-749.

Passing 30 mash. ¼ ton per acre.



Retained on 30 mesh. 1 ton per acre.

The relative cover from coarse and fine fractions. Note that the fine fraction is shown as applied at one-quarter the rate of the coarsely ground material.

the fine material. Analysis showed the percentage of calcium carbonate in these fractions to be as follows:—

	Mauriceville (hard)	Waikari (soft)
Complete Commercial Sample	92.9	85.9
Coarse Sample	94.8	87.0
Fine Sample ..	91.5	85.5

The amounts of lime applied to the various treatments were adjusted on the basis of these figures.

Botanical Composition Of the Pasture

Perennial ryegrass was the dominant constituent of the sward throughout most of the year, and with white clover these two species contributed the bulk of the pasture production. Other species of relatively less importance were cocksfoot, crested dogstail, sweet vernal, yorkshire fog, browntop, *poa pratensis*, *poa annua*, and *poa trivialis*. The last-named species was occasionally too prominent on the sward to allow of maximum production, and in April, 1935, an attempt was made to eradicate it by severe harrowing and surface sowing with certified white clover. This, however, met with little success.

The sward was sown down originally before the certification of pasture seeds was introduced, and unfortunately an inferior strain of white clover was used. This was reflected in a pasture with too little clover at most periods of the year, and also in one with rather large amounts of low-producing grass species. Separations of the mown herbage into its species components showed that the effect of lime was to increase the clover-content slightly, and to decrease the percentage of inferior grasses.

Effect of Treatments On Yield of Herbage

Table 1 shows the yield of green herbage in each season for the control (Treatment 1) and the response in production to superphosphate and Mauriceville commercial lime respectively.

The differences in black type are statistically significant. To analyse the results statistically we have to use the green weights, but the yields of dry matter are strictly comparable with these. Tables 2 and 3 show the small differences between the types of limestones and their effect on production.

TABLE 1: YIELDS OF GREEN HERBAGE IN CWT. PER ACRE.

Year.	Treatment 1 (control).	Difference in Production between Treatments.	
		Treatments 2-1. Super response.	Treatments 3-2. Mauriceville lime response.
1934/35	314.8	**63.5**	**24.0**
1935/36	508.8	**128.5**	**32.8**
1936/37	494.5	**95.0**	**13.6**
1937/38	301.1	**62.7**	**31.8**
1938/39	292.5	**87.6**	**33.6**
1939/40	300.7	**73.1**	**20.5**
Total period 1934/40	2,212.5	**515.4**	**156.3**

TABLE 2: DIFFERENCES IN YIELDS (CWT. PER ACRE) OF GREEN HERBAGE (COMPARISON OF MAURICEVILLE (HARD) WITH WAIKARI (SOFT) LIMESTONES).

Year.	Response to Mauriceville Commercial Limestone.	Differences in Favour of Waikari Lime.		
		Commercial Sample.	Coarse Fraction.	Fine Fraction.
1934/35	24.0	+8.0	+6.9	—3.9
1935/36	32.8	—7.9	+0.1	+0.3
1936/37	13.6	—2.9	—5.2	+1.4
1937/38	31.8	—7.8	—5.4	+6.0
1938/39	33.5	—2.2	—0.9	—2.3
1939/40	20.5	+0.1	—2.9	+8.8
Total Period 1934/40	156.3	—13.7	—7.2	+10.3

TABLE 3: DIFFERENCES IN YIELDS (CWT. PER ACRE) OF GREEN HERBAGE (COMPARISON OF THE EFFECTS OF FINENESS OF GRINDING)

Year.	Response to Mauriceville Commercial Limestone.	Difference in Favour of Fine Fraction.			
		Commercial Sample.		Coarse Fraction.	
		Mauriceville	Waikari.	Mauriceville	Waikari.
1934/35	24.0	+11.5	—0.4	**+26.1**	+15.2
1935/36	32.8	—5.8	+2.4	+12.8	+12.9
1936/37	13.6	—4.9	—0.7	+19.5	+26.0
1937/38	31.8	—9.8	+4.0	+7.5	**+18.9**
1938/39	33.5	**—6.5**	—6.6	—1.8	—3.2
1939/40	20.5	—2.0	+6.7	+4.9	**+16.6**
Total Period 1934/40	156.3	—17.5	+5.5	+69.0	+86.4

(The differences in black type are statistically significant.)

The above tables may be summarised as follows:—

(a) The response to limestone is not great in comparison with that to superphosphate, but it is definite and consistent.

(b) There is no significant difference between the Mauriceville and Waikari limestones in their effect on pasture production in any of the fractions studied.

(c) There is no significant difference between the commercial sample and the fine fraction of either the Mauriceville or the Waikari limestone.

(d) The fine fraction tends to yield more than the coarse, but the effect is not marked except in the first years of the trial, although it is more sustained in the case of the Waikari lime.

It may be concluded, therefore, that the commercial samples of both the hard and the soft limestones do not differ significantly in their effect on pasture yields, nor do they differ from the "fine" fraction. The coarser material is less effective than any of the above types.

No lime was applied after July, 1936, and it will be seen from the foregoing tables that the duration of the lime response was similar on all treatments, although, as expected, the coarser samples tended to make good their disadvantage in respect of pasture production towards the end of the trial period.

Mr. Doak in his paper referred to previously, reaches the following decisions based on chemical evidence:—"Ground limestone containing at least 50 per cent. of material passing 30-mesh screen is quite satisfactory and the cost of finer grinding is not justified," and "for pasture topdressing, hard limestone was as effective as the soft." These conclusions are fully supported by the yield data.

Acknowledgments

The thanks of the writers are due to Mr. W. B. Wards, Overseer at the Marton Experimental Area, for the accurate and detailed field work of the trial. The experiment was started by Mr. A. W. Hudson, former Crop Experimentalist to the Department, and has been carried on since then by Mr. J. W. Woodcock and his successor, Mr. A. G. Elliott. The analyses of herbage for dry matter and the soil analyses were carried out by Mr. B. W. Doak; Grasslands Division, Palmerston North. Other Officers of the Grasslands Division carried out detailed botanical analyses of the sward of the trial, and much assistance was freely offered by many officers from the Department of Agriculture and the Department of Scientific and Industrial Research.

Sheep Mortality In Canterbury

FOLLOWING the field survey of sheep mortality in Canterbury by veterinarians and agriculturists, it was considered that further progress necessitated intensive investigations on an experimental farm with a bad history, writes the Acting Director of the Animal Research Division in his annual report. Such a farm has been leased in the Kirwee district as from January 1, 1940, and experiments have been initiated to study all phases of sheep mortality which occurs in the Canterbury district, especially in wet seasons. Special attention is being paid to the effect of parasite control and various methods of sheep management and feeding. The role played by parasites must be closely studied, and regular chemical analyses of pasture and supplementary feeds are being made. The Canterbury Agricultural College is actively collaborating in this work and is especially interesting itself in the digestibility of pasture and supplementary crops grown in Canterbury.

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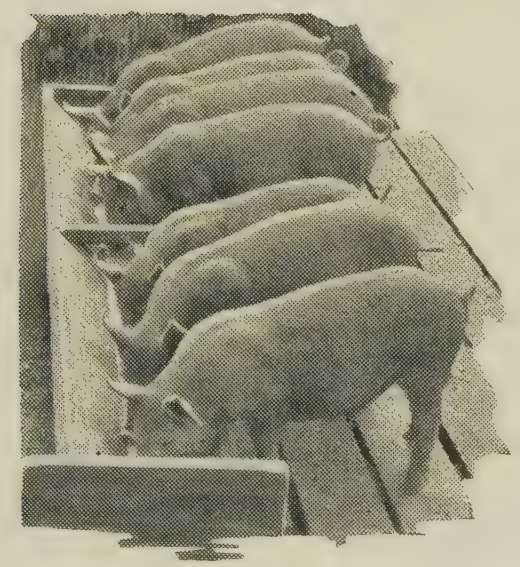

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Topdressing in Mid-Canterbury

The most common method of distributing fertilisers and lime in Mid-Canterbury. Applying lime at ½-ton per acre, one lorry will do 30 to 40 acres a day under average conditions.

Lime and Superphosphate Have Proved Most Beneficial

Topdressing trials in Mid-Canterbury have yielded evidence that in almost all districts systematic topdressing over a period of years will eventually lead to increased carrying capacity and more healthy stock. It is emphasised, however, that to obtain the maximum benefit from topdressing the practice must be associated with a general scheme of pasture improvement, and that farmers must not expect immediate results.

G. K. McPHERSON, Instructor in Agriculture, Ashburton.

LYING between the sea and the foothills, and bordered by the Rakaia River in the north and the Rangitata River in the south, Mid-Canterbury contains approximately three-quarters of a million acres of land, which slopes gradually from sea level to approximately 1200 feet high at the foothills. Some few years ago a geological survey disclosed some 40 to 50 different soil types within this area. In the main, they are composed of a silt loam overlying gravel beds of porous shingle. Near the rivers the top soil is usually free from stones, but elsewhere the surface soil has become mixed with the underlying shingle, forming soils of a stony nature.

The natural fertility of the soil within this area varies considerably. In parts of Wakanui, Eiffelton, Methven, and stretches along the banks of the Rakaia, Ashburton and Hinds Rivers, the soil is very rich, and cropping with cereal and pulse crops is carried out here on an extensive scale. In any one year as much as one-third to one-half of the total farm area may be under crop.

On the other hand, there are areas in the county where the carrying capacity may be less than one ewe per acre and farm returns are obtained mainly from wool and store lambs. Between the two extremes mentioned there are innumerable soil types which vary in fertility and where the farm management practice is largely dependent on climate and relative market prices for cash crops and sheep products. From a farming point of view, however, the soil types can conveniently be classified into three main groups, namely, light, medium, and heavy.

Climate

Near the coast a rainfall of 20in. to 25in. a year is usually experienced. This amount gradually increases until the foothills are reached, where the fall may exceed 40in. Over the greater part of the county, however, the rainfall is about 28in. This rainfall is usually ample for the system of farming practised, with the exemption of the summer months when, because of the porous nature of the underlying shingle, the hot, dry summer winds tend to parch the ground, particularly on the medium and light soil types.

Grass growth throughout the winter months is almost negligible because of cold, frosty conditions. Snow is common around the foothills, but usually only one or two falls a year are experienced over most of this country. In the winter and spring cold south-westerly winds may make conditions unpleasant for stock, but in this respect the county is fortunate in being fairly well sheltered by plantations and gorse hedges.

Pastures

On the plains land of the county there are approximately 500,000 acres of sown grassland. The life of the average pasture is about four years, so that, allowing for areas which are in

permanent pasture, something like 100,000 acres are sown down to grass each year. The pure sowing of grass is the exception rather than the rule. On areas where cash crops are produced the grass mixture is frequently spring-sown in a cereal crop or sown in the summer with rape and turnips. On the light sheep country sowing down to grass with rape and turnips is the most common practice. While these methods of grass establishment are possibly not conducive to the production of first-class pastures, over a long period of years this system has proved the most economic.

The chief pasture species sown are perennial ryegrass and red clover. Cocksfoot, crested dogstail, white clover, and alsyke clover are used to only a limited extent. Recently, subterranean clover has been widely sown with mixed results. It is usual for most pastures to give reasonably good production over a period of two years. From then on the ryegrass and the red clover gradually diminish in quantity, and are replaced by foreign growth. On the light and medium land, browntop, sweet vernal, and hairgrass are the chief offenders, while on the heavier soil types hairgrass and various forms of flat weeds eventually replace the better pasture species. Ultimately, the pastures cease to be economic and are ploughed up—usually put through a course of cropping—and then sown down to grass again for a further period.

Stocking

The latest figures available indicate that there are almost 1,000,000 sheep, including 750,000 breeding ewes ,and also 10,000 dairy cows on the plains land of the county. Assuming the returns per ewe to approximate 25/-, then sheep products contribute something over £900,000 annually to the wealth of the county. Butterfat returns would realise a further £100,000. Rape, turnips, and green feed certainly contribute their share, but grass undoubtedly provides the major portion of this wealth.

With the exception of potatoes, peas, grass, and clover seed, there are no export markets for our surplus crops, so that any increase in production in the future will be attained largely by a higher stock-carrying capacity of our grasslands. Greater attention in the establishment and maintenance of pastures than has been the case in the past will be necessary to bring this about.

Ashburton Soils

Chemical analysis of Ashburton soils carried out by Kidson show that over the greater part of the plains there is a deficiency of available phosphates. In soils of comparatively recent origin—such as occur along the south bank of the Rakaia River from the Gorge to the railway, along the Ashburton rivers from Upper Winchmore to the sea, and in certain areas along the Rangitata River—the available phosphate content is relatively high. The old, loose soils of the plains, however, are almost without exception low in available phosphates.

The area between the Rangitata and the Hinds, extending from Ruapuna to Lowcliffe, from Valette to Willowby in the Hinds-Ashburton section, and the large area between the Ashburton and Rakaia represented by Sherwood-Fairton-Dromore-Seafield-Pendarvas, all show a low available phosphate content. Unlike the main rivers, the Hinds is also associated with soils deficient in available phosphate.

The lime status of Ashburton soils was also examined at the time phosphate determinations were made, and the results showed that all the soil types were more or less acidic in nature. Along the banks of the three main rivers soil tests indicated a

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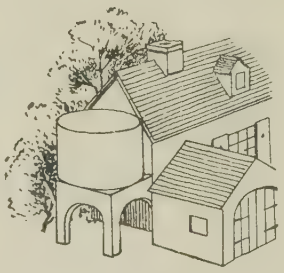

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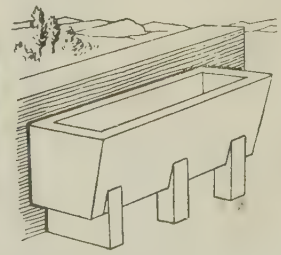

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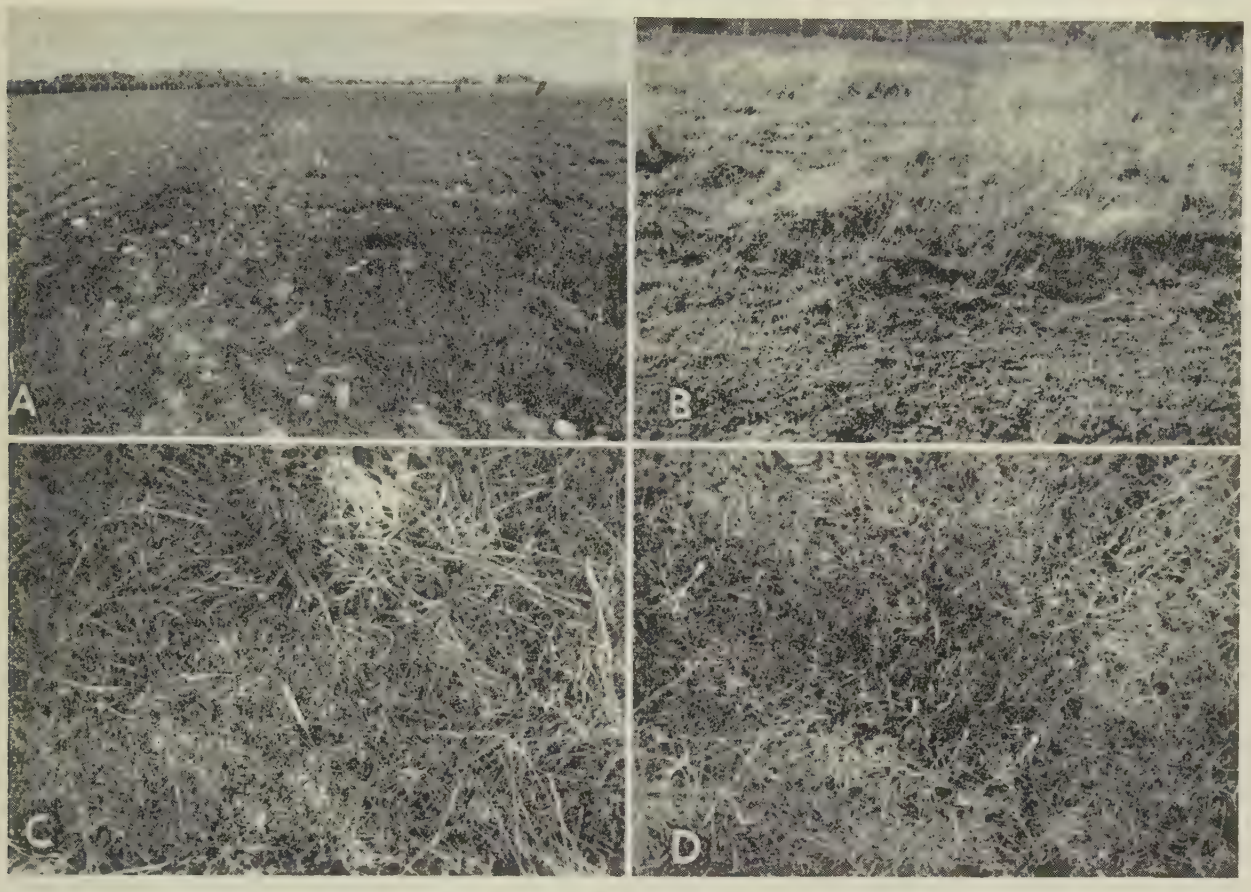

(a) The value of superphosphate in the establishment of young pastures is well demonstrated in this photograph. The land on the right was treated with superphosphate, while that in the middle received no fertiliser. *(b)* The land in the foreground was given 5 cwt. of carbonate of lime and 2 cwt. of superphosphate, while that in the background received no treatment. *(c)* Superphosphate and lime was applied here on native tussock. A splendid growth of white clover has resulted and the feed made more palatable. *(d)* Original pasture consisting mainly of native tussock, browntop and odd plants of cocksfoot.

moderately sweet soil. Elsewhere, however, the lime status was comparatively low, suggesting a soil of a rather sour nature.

Topdressing Trials

During the past 10 years or so some 60 or more observational topdressing trials have been laid down in various parts of the county by the Fields Division of the Department of Agriculture. The fertilisers used have been superphosphate, basic slag, ephos, sulphate of ammonia, ammoniated super, and 30 per cent. potash salts. Lime, either in the form of burnt lime or carbonate of lime, has been applied in the majority of the trials laid down.

In most of these trials the response to phosphates and lime has been most marked, while in a few cases an almost negligible response has been obtained. It is of interest that the poorer responses have been recorded mainly on those soil types shown by Kidson on chemical analysis to be relatively rich in phosphates and lime.

Present Position

The area topdressed annually with artificial fertilisers varies, but it is usually about 30,000 acres, or some 6 per cent. of the total area of sown grasslands. This figure compares very unfavourably with the Dominion average for 1937-38 of 22 per cent. Figures for lime applications over the past 10 years may also be of interest. In 1928-29, 1526 tons of lime were used. This figure progressively increased to 3877 tons in 1931-32, 5889 tons in 1935-36, and 10,637 tons in 1936-37.

These figures indicate that while the farmer is gradually realising the necessity of lime applications, the area topdressed with lime is still comparatively small. Taking the latest figure of 10,637 tons, and assuming it was applied at the rate of 5cwt. per acre—although the quantity applied would probably be much higher—then some 44,000 acres, or only 9 per cent. of the total area of sown grassland, would receive dressings of lime. Expressed in another way, at the present rate of consumption it would take 10 years to supply 5cwt. per acre to our grass areas.

By far the greater quantity of lime and phosphates used annually is applied to the light and medium soil types. Topdressing is concentrated mainly on those areas where sheep products, or, alternatively, grass, provide the main source of farm income. On the better class wheat land, where cash crops are extensively grown, topdressing is practised very little.

In most parts of the North Island the advisability of topdressing is not questioned, and the majority of farmers are agreed that it pays to topdress. Why, then, is it that the area topdressed annually in Mid-Canterbury is so small? The reasons are many and varied. In the first place, the soil, and particularly the climate, do not allow the spectacular results that are obtained in many parts of the North Island from topdressing. The winters are usually fairly severe, with little growth taking place, and in a normal season the pastures on the medium and lighter lands are inclined to burn up considerably in the summer. Grass growth of any consequence, therefore, only occurs during September, October, November, December, March, and April—a period of six months, as against a period of nine months or more in most districts of the North Island.

Size of Holdings

The size of farm holdings would also appear to influence the amount of fertilisers used. When large areas of light to medium land are held, farmers are not inclined to practise topdressing on an extensive scale. Fear of grass grub attack to pastures and doubts as to whether an economic response can obtain with ruling prices for wool and lamb are also contributing factors tending to restrict topdressing practice.

Viewed from another angle, however, an increase in the acreage topdressed annually would appear essential if production is to be increased or even maintained at its present level. At the present time Mid-Canterbury grasslands are carrying approximately two sheep per acre, and, in addition, cropping is carried out on an extensive scale. Mid-Canterbury's wheat acreage varies between one-quarter and one-third of the Dominion total, while oats, barley, and peas are also largely grown.

With most crops it is the practice to sow 1cwt. of superphosphate per acre and a further 1cwt. if "grassing down" with the crop. Assuming that the average pasture remains down for four years, then actually all that the land has been receiving in the way of fertilisers is some 2cwt. of superphosphate per acre spread over five years.

In many cases this practice has resulted in more phosphates being removed in sheep and crop products than are being returned to the land in the form of artificial fertilisers.

The drain on fertility, spread over many years, is now evident over large areas of the county, but more particularly where wheat is being grown. The failure of clovers to establish in pastures and the general lack of vigour of clover growth are symptomatic of a phosphate and lime deficiency. Systematic topdressing over a period of years would appear to offer a mean by which the balance of fertility could be restored.

Advantages of Topdressing

Topdressing undoubtedly prolongs the life of the pasture, and also increases the carrying capacity. Mention was made earlier in this article that most pastures in Mid-Canterbury deteriorated fairly rapidly after the second year. With systematic topdressing, the ingress of browntop, sweet vernal, and hairgrass could be largely controlled and the carrying capacity of the pasture maintained.

Topdressing brings growth away earlier in the spring, and permits earlier lambing, with a greater percentage of milk lambs. This is an important point in a district where it is becoming increasingly difficult to grow good crops of rape.

Topdressing improves the health of sheep. An analysis of pastures topdressed with lime and phosphates shows a corresponding increase in the mineral content of the herbage. Stock licks are largely used merely because pastures generally are deficient in mineral matter.

Topdressing, by prolonging the life of the pastures and curtailing the area in supplementary crops, tends to reduce cultivation costs.

Phosphates

There is no question that the most profitable response on Ashburton soils is obtained from applications of phosphatic fertilisers. Phosphates encourage and maintain clover growth, thereby thickening the pasture and assisting the grass species in the sward. Of the three forms of phosphates available on a commercial scale—superphosphate, basic slag, and rock phosphate—the former has undoubtedly given the most economic response.

In all the observational topdressing trials conducted by the Department superphosphate has proved superior to other forms of phosphate. It is possible that on wet areas nearer the foothills slag may prove profitable, but it is only recently that trials containing slag have been laid down on this class of country. Rock phosphate has not given a sufficient response to warrant its use.

Potash

Potash, in the form of 30 per cent. potash salts, has been tried in a considerable number of experiments, but whether applied alone or in combination with superphosphate or superphosphate plus lime, it has in no case resulted in a visible increase in growth or given a noticeable sward improvement. It is possible, however, that potash may give an economic response on land which has previously been adequately topdressed with lime and phosphates.

Nitrogen

But sulphate of ammonia and ammoniated super have been tried out on varying soil types with no great degree of success. Both these fertilisers will produce a flush of feed in the spring, but for a short period only. The tendency with too heavy dressings or with continuous dressings is to deplete the sward of clover. As a special purpose manure, sulphate of ammonia can be used to a limited extent for producing early spring feed. Its general use, however, cannot be recommended.

Lime

Two forms of lime are available in Mid-Canterbury—carbonate of lime and burnt lime. The former is more popular, being easier to obtain and more congenial to handle.

Results of observational topdressing trials, coupled with actual farming experience, have proved unquestionably that on most soil types lime is the basis of topdressing practice. If full value is to be obtained from applications of phosphate fertilisers lime must be used in addition. It is not necessary for the lime to be applied some months before the phosphates; equally good results will be obtained by applying both lime and fertiliser at the same time. Lime improves the physical condition of the soil, and for this reason it is to be recommended, particularly on wheat areas which are difficult to cultivate down to a good tilth or which tend to crack rather badly during dry weather.

Relative costs should determine which form of lime is used. Burnt lime, even on the light land, responds equally as well as the carbonate.

Time of Application

The time of application is not a greatly important factor. Phosphates do not leach through the soil, and they may therefore be applied whenever farm operations permit. On land which has previously received lime, applications of superphosphate may be made in the autumn. Otherwise, lime and superphosphate can be applied at any time during the winter and early spring.

While lime will undoubtedly give a good response when applied to established pastures, experience suggests that in a low rainfall area the best results are obtained by applying the lime to cultivated land. It would seem—and this applies more particularly to the light and medium land—that the prospects of obtaining good clover establishment are enhanced if the lime is lightly covered just before sowing the grass mixture.

Quantities to Apply

It is difficult to recommend definite quantities of lime for any particular soil type. Intrials conducted in the county quantities ranging between 5cwt. and 2 tons per acre of carbonate of lime have been tried out, the larger quantities being used to gain some information on the period during which lime will continue to give a response. Cases have been noted where 5cwt. per acre has given quite an appreciable response, but larger applications have increased the clover content of the sward and also made the growth much more palatable to the stock.

Cost of application, type of pasture, and length of time it is intended to leave the area in grass are all factors which must be taken into consideration when deciding on the amount of lime per acre to be applied. In general, 10cwt. per acre of carbonate of lime should prove a reasonable dressing on the medium and light land in the county, while on the heavier class of land known to respond to lime, applications up to one ton per acre of carbonate could be used.

In trial work superphosphate has been used in quantities varying between 1cwt. and 3cwt. per acre, and it has been found that the best response—though not necessarily the most economic—has been obtained with heavier applications. Actually, the type of soil, the class of pasture, and the rainfall should determine the amount of superphosphate to apply. On light land where topdressing is practised annually one bag of superphosphate per acre should prove ample. On the heavier land this amount could be increased with advantage to two bags per acre.

General

To obtain the maximum benefit from topdressing the practice must be associated with a general scheme of pasture improvement. Too often results are expected from topdressing when the fertilisers have been applied to a poor pasture. An absence of response in such cases has led the farmer to condemn topdressing, when actually it is the pasture which is at fault and not the fertiliser. The first consideration is a good grass cover, with a proper balance of clovers to grass. It is only by sowing good seed and giving the pasture every opportunity to establish that useful results become apparent.

Both phosphates and lime encourage clover growth, and legumes must be present in the pasture to enable the fertiliser to work efficiently. On most farms are to be found pastures in varying stages of growth—good, poor, and indifferent. In cases where the area which can be topdressed is limited, farmers should concentrate on maintaining the production of their good pastures rather than endeavour to improve their older ones.

Each year cases come under notice where farmers use considerable quantities of lime but no superphosphate. It is very doubtful whether this practice is wise. Lime alone has been used in several of our topdressing trials, and the response has been very poor indeed. Further, the growth on "lime-alone" areas has not proved nearly so palatable to stock as those areas which received both lime and superphosphate. Results of trial work undoubtedly suggest that farmers would be wise to topdress with superphosphate those areas which receive lime, rather than to concentrate on lime alone.

Finally, farmers should not expect immediate results from topdressing. Building up the fertility of the soil so that it will carry better swards must be a gradual process. There is evidence in almost all districts in Mid-Canterbury that systematic topdressing extending over a period of years will eventually lead to increased carrying capacity and more healthy stock.

Answers to Correspondents

Mixing Super and Lime

F.M.R. (CANTERBURY):—

I wish to know how long before sowing with turnips, super and lime may be mixed together without any deterioration in the mixture. Also, how long superphosphate may be kept before use.

FIELDS DIVISION:—

Lime and super mixtures do not deteriorate so long as storage conditions are satisfactory. You may therefore mix lime and super for your turnip crop well ahead of the time intended for sowing.

Regarding superphosphate, this fertiliser does not actually deteriorate under storage, although under long storage there is a tendency for the formation of a small percentage of reverted (di-calcium) phosphate. This, however, does not materially affect the value of the fertiliser, although rendering it somewhat slower in action than fresh material.

Hygiene in Pigs

Suipestifer infection continues to be responsible for a considerable mortality in pigs in several districts, states the annual report of the Director of the Livestock Division. It would appear as if the organism became more virulent on some properties, the mortality rate being so high. Losses in young pigs due to the disease are heavy, but on occasions the mortality in older pigs is quite a feature of an outbreak. A higher standard of hygiene in the piggery, including better and cleaner feeding, will assist in preventing outbreaks of the disease. Experiments are being conducted by field officers with regard to a special treatment of affected pigs. Although only limited trials have been so far completed, there is some room for optimism. Further trials are being arranged.

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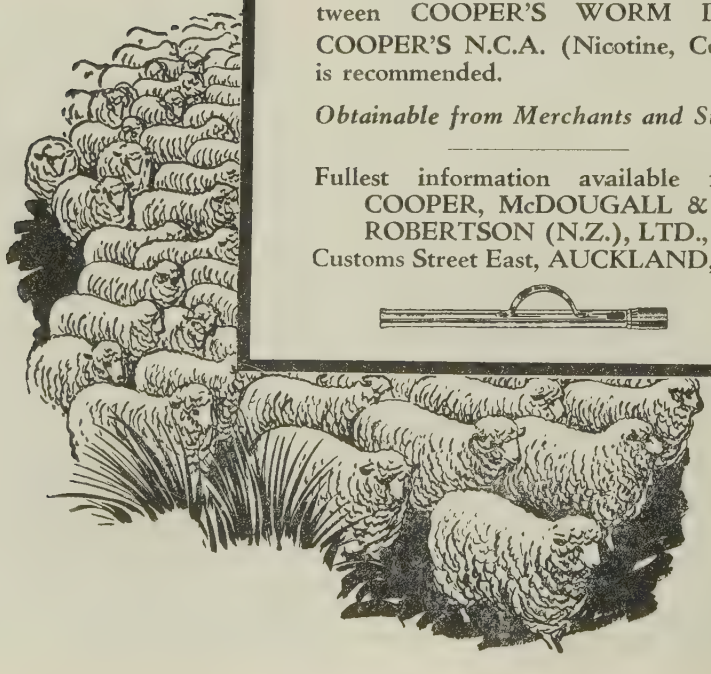

Dosing is often as important as dipping!

Veterinary Notes for the Farmer

Discussions on First-Aid Measures

Contributed by the Livestock Division

Dipping Precautions to Prevent Mortalities

CERTAIN details must be observed in the important operation of dipping if mortalities and loss are to be avoided. The sheep is a susceptible subject to pneumonia and pleurisy if any of the dipping fluid is aspirated into the lungs or if the weather at the time of dipping is not suitable. The work of dipping a flock is a most important part of good flock management, in that clean sheep free from lice and ticks thrive better, are more contented, and the wool will bring a better price of it is free from tick staining. There should be no risk of mortality if certain well-known rules are followed in detail.

The dipping fluid should be made up in accordance with the instructions laid down by the makers of the particular dip being used. All details as to the immersion of the sheep should be carried out to ensure the eradication of lice and ticks. If good results are to be obtained it is necessary for the sheep to be wet right to the skin, and the head must be immersed once or twice during the swim. The sheep requires to be in the bath about one minute for thorough wetting, and the time can be gauged by the amount of fleece and the degree of parasitic infestation present. If the sheep are seriously infested with parasites a second dipping in about three weeks is necessary, as some eggs may have escaped the first bath and later hatch out.

To ensure accuracy in making up the dip according to the instructions it is necessary to know the capacity of the dip. The dip should be thoroughly cleaned out before filling with water, all sludge and dirt being removed. The capacity should be measured accurately, and the correct amount of the concentrate dip added. If a powder dip is being used the amount should be weighed accurately and made into a paste before being added to the water.

Thorough Stirring Necessary

Whether a fluid, powder, or paste dip is being used, thorough mixing by stirring of the bath is necessary to ensure that the dip is of the correct strength throughout. If this is not done some of the lighter ingredients of the dip may be concentrated on the surface and some of the heavier in-

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gredients may fall to the bottom of the dip. Repeated stirring and plunging is necessary if any delay takes place during the day's operations, and a periodic use of the plunger will prevent much of the powder settling in the bottom of the dip.

Soft water, such as rain water, should be used if possible, as better mixing takes place. If hard water must be used it is necessary to counteract the hardness by the addition of 3lb. or 4lb. of washing soda per 100 gallons of water in the dip.

With soft water in a clean dip, the quantity correctly measured, the exact amount of concentrate dip added, and the whole thoroughly stirred and prepared in advance, all that is necessary before dipping begins on the following morning is the free use of the plunger from one end of the bath to the other to ensure the suspension of the active dipping ingredients.

Care of the Sheep

As for the sheep, certain precautions are also necessary. The sheep should be rested thoroughly immediately before dipping and have free access to water. Heated or driven sheep will be seriously affected by dipping, and even in the absence of a cold night or adverse weather setting in are much more subject to pleurisy or pneumonia. Dirty or daggy sheep should be cleaned up to prevent fouling of the bath and a reduction of the effectiveness of the dip.

The dipping should be carefully supervised, and each animal allowed to breathe after its first immersion before the crutch is used to immerse the head again. A rest in the draining pen is necessary to remove all surplus dip from the fleece and to enable the animal to recover from the shock of the immersion. Biting dogs should not be used in the mustering and yarding, as there is a danger of absorption of poison through the broken bite wounds.

A good day should be selected, and the dipping of rested sheep should be started early. Dipping operations should cease early in the afternoon to enable the last sheep put through to dry out as much as possible before nightfall.

Dipping Rams

Extra care is necessary in the dipping of rams. These animals are generally dipped early, as, with the approach of the breeding season, there is a greater risk of mortality taking place. In the case of very fat or valuable stud rams, spraying or careful hand immersion may be followed in order to avoid any risk of loss.

Dipping is such a necessary and important part of sheep farming in order to eradicate and prevent parasitic infestation of the sheep that these notes would convey a wrong impression if dipping were considered a dangerous cause of mortality. With reasonable attention to detail as suggested, no owner should suffer losses of sheep following dipping.

Daggy Sheep at Freezing Works

FARMERS could do much to expedite the handling of sheep at the freezing works by ensuring that no "daggy" sheep are forwarded. Although a shearing appliance may be installed at many works to deal with an occasional daggy animal, it is too much to expect the works to deal with a line of daggy sheep.

The neglect to send forward clean lines of sheep from the farm may be due to a misunderstanding that this matter can be easily rectified at the works. This is not so, however, as daggy sheep will require to be dagged in the yards, or, if attempted on the chain, a very insanitary slaughtering floor will result. The delay and disorganisation of the continuity of slaughtering is a serious matter in increasing the cost of killing when daggy sheep are sent forward.

Every effort should be made to have a line of affected sheep cleaned up at the farm in order to assist in the hygienic and expeditious handling of the stock at the killing end. This is particularly important during the busy part of the season. Seasonal and feed conditions play such an important part in the incidence of dagginess that every assistance requires to be given in a bad season. No doubt it is not always possible at the present time to clean up every animal on the farm, but the control of dagginess on the farm is an important factor in lessening the incidence of strike. The saving of a few lambs in this direction would help to pay for the cost of dagging, provided the labour is available to carry out the work.

It is hoped that reasonably clean lines of sheep will be sent forward for slaughter this season, so that the stock may be handled at the works with efficiency and to the best advantage.

Advisory Service on Veterinary Matters.

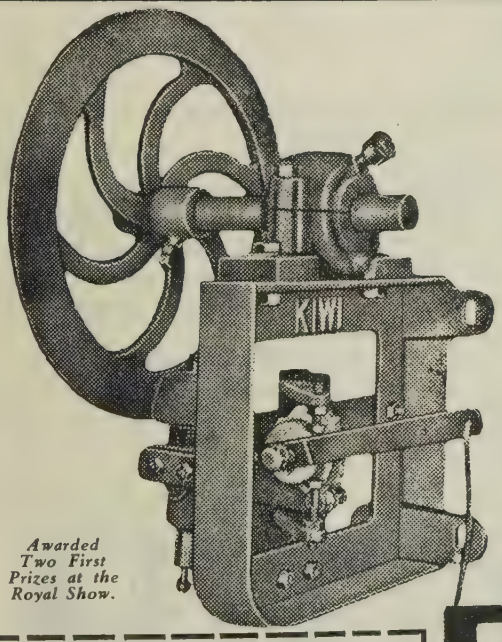
Farmers are invited to submit inquiries connected with the health of their stock, and the replies will be published under this heading.

Answers to Correspondents

Lumps on Cows' Legs

"WORRIED FARMER" (Rangiora) :—

Would you please advise me through your "Journal" what is causing lumps to appear on my cows' legs. I have two grade Jersey cows, both third calvers. One cow has some lumps on her front legs the size of a small egg. She also has some tiny lumps about the size of a pea on the other leg. On opening two of the smaller lumps with a sharp knife, I found they contained a thick yellow substance about the consistency of mustard, which did not smell so, and presume is not the result of injuries or bruises.



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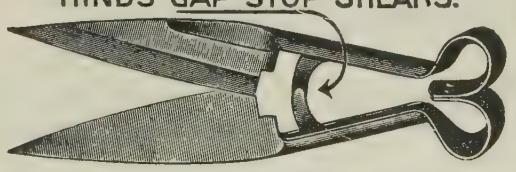

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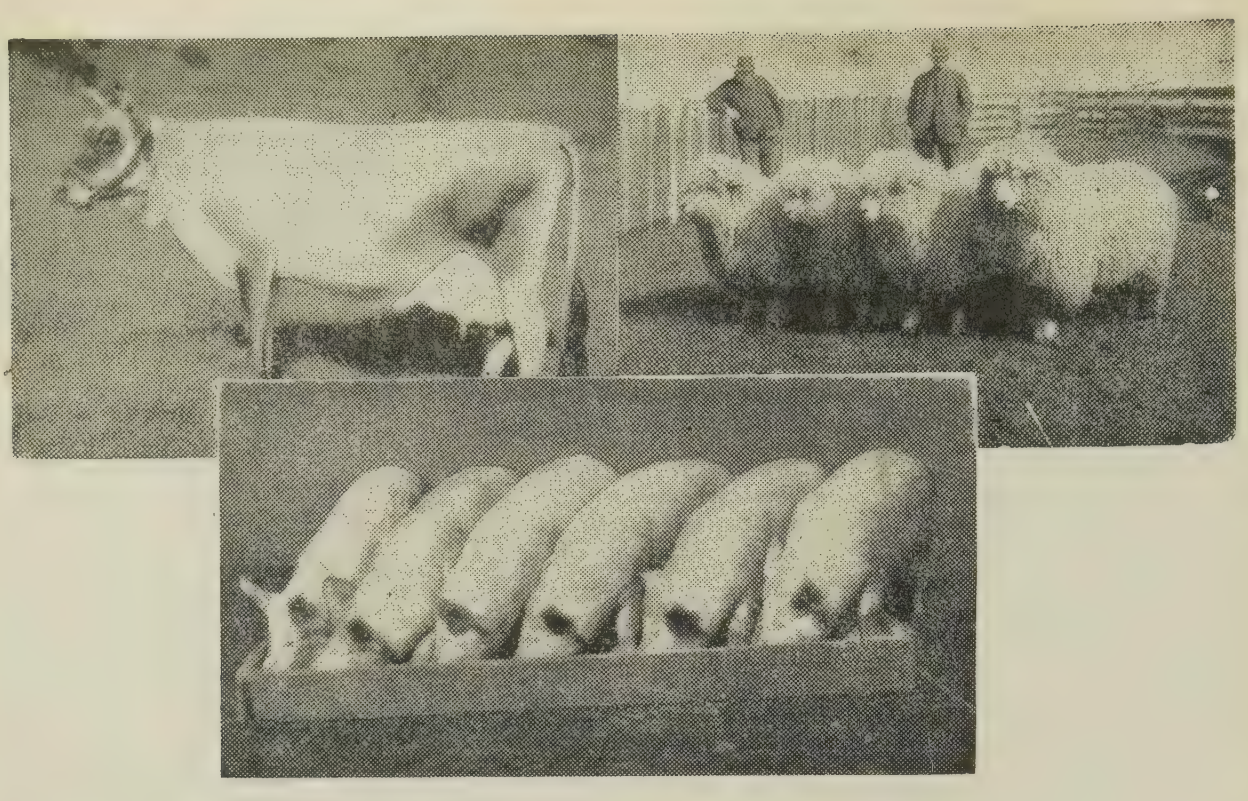

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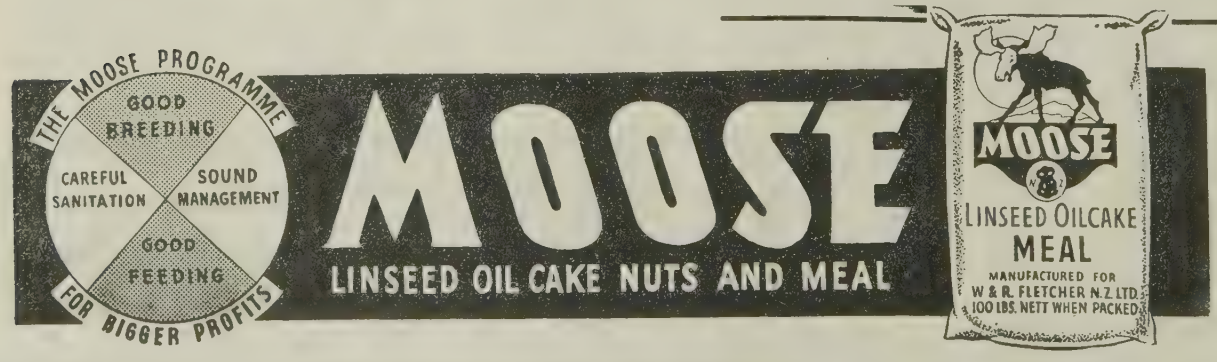

The other cow has an egg-size lump on the point of the left shoulder and a smaller one just inside the left knee-cap.

The larger lumps on the first cow are situated just above the hocks and on the outside (front legs).

Would you please advise me what is the cause and what to do about it? Is it a contagious condition or the result of mineral deficiency? Would it be advisable to use their milk? Both cows appear to be in good health and are milking well. They are on grass pasture, but do not get a mineral lick. I have two other cows on the farm and they are not affected in this way.

LIVESTOCK DIVISION:—

Although the lesions described by you are somewhat rare, the chain of small lumps are not unknown to owners of stock and others acquainted with stock diseases. The symptoms described by you suggest that the yellow pus in the lumps is due to an organism of the acid fast type, similar to the organism causing tuberculosis. In similar cases which have been investigated in the past it has been shown that the organism most closely resembles the organism responsible for tuberculosis in poultry, known as the avian type of tubercle bacillus.

Some of the cows affected by the lumps have reacted to the tuberculin test, and, again, in other cases no reaction has been seen. As the avian type of organism is not so serious as the bovine type so far as the human subject is concerned, it is not likely that there is much danger from using the milk. It is difficult to explain these superficial lumps as being other than local skin infections, and post-mortem examinations have shown very little evidence of tuberculosis in the internal organs.

Lumps on Base of Teats

H.J.F. (Hawera):—

Could you give me any information on a complaint I have in my herd? The symptoms are at the base of the teat a lump forms—about the size of a bird's egg. It is under the skin, and when touched seems to cause the cow no pain. After a period of about a fortnight it comes to the surface and bursts—like a boil on humans—discharges pus and goes away. I have several cows with it, and all of them have come and nearly all gone this month.

LIVESTOCK DIVISION:—

As described, the conditions appear to be as you suggest, a "boil"—that is, a small abscess due to infection of some small wound or injury by the common pus-forming germs. The injury might just possibly be caused by the top of a teat cup, or by a milker's hand. No special treatment appears necessary, apart from painting the swelling with iodine and milking affected cows last to lessen the chance of infection to others.

Preventive measures would include use of a suitable antiseptic, such as Condys in water used to wash udders, frequent changes of washing water, and scalding of any clothes after each milking.

Cowpox is an acute contagious disease affecting the teats, but the small blisters are more numerous and are tender to the touch, so that the cow resents handling. The lumps are rarely the size of a pea.

In an outbreak of cowpox care should be taken to avoid the spread from cow to cow; affected cows should be milked last, and a mild ointment, such as zinc ointment, applied to sores. The milker should wash his hands thoroughly after handling affected cows, as the disease is communicable to human beings.

Your description, however, does not suggest cowpox.

Swelling on Horse's Hock.

J.O.H. (ARIA)—

I have a horse which has a swelling in the hock, just in front of the ham string. It is a soft lump, and can be pushed in with fingers. It has been there for several years. Could you tell me through your columns what this is, and whether there is any cure for it?

LIVESTOCK DIVISION—

From your description I would say that your horse is suffering from a condition known as thoroughpin. The movement of joints and tendons over joints is facilitated by the presence of an oily synovial fluid. This fluid is secreted and retained in position by various capsules. The distention of the capsule round the tendon which passes over the back of the hock is termed thoroughpin.

The condition may be due to external causes, such as severe strains resulting from heavy pulling, fast driving or jumping, or may be the result of internal disorders.

Thoroughpin rarely, if ever, causes lameness and, while being a blemish, does not hinder the usefulness of the animal.

In the early stages improvement may be effected by rest and the application of cooling lotions. Later, pressure by some form of bandage or pad is beneficial, but is difficult to retain in position.

Your case, however, being of such a chronic nature, is not likely to respond readily to such treatment, and I doubt if it is worth attempting.

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Farm Practice and Management

Contributed by Officers of the Fields Division

Selection of Seed Mixture For Autumn-sown Pasture

By A. V. ALLO,
Instructor in Agriculture,
Tauranga.

WITH the approach of autumn, many farmers will be thinking of ordering the grass seed mixture for their new pastures. From the number of inquiries received from farmers, it is evident that opinions vary greatly as to what is the ideal seed mixture, and these remarks are intended as a guide to assist farmers in solving this problem.

On the light soils of the Bay of Plenty, as on all other types of soil, satisfactory clover establishment is essential to the success of the pasture. Some farmers do not include white clover in their seed mixture, claiming that it will eventually come into the sward of its own account, but the entry of such volunteer clover is usually slow, and in the meantime the ryegrass will have suffered severely through the deficiency of nitrogen normally supplied by the clover. Volunteer white clover is almost invariably of a poor, low-producing type, and certified white clover should always be included in the seed mixture. Red clover, too, is of value, as it yields much valuable feed during the earlier years of a pasture, and helps to provide the grasses with much-needed nitrogen.

Perennial ryegrass is also essential, as it produces the bulk of the early spring flush, together with valuable feed in the late autumn. Paspalum is also a grass of great value in the Bay of Plenty. Some farmers fear it will get out of hand and assume such dominance in a sward that all other species will be subdued or even choked right out, but under a proper system of grazing management, together with adequate topdressing and the use of the mower for topping where necessary, paspalum may be controlled just as readily as any other species of pasture plant. The wealth of feed it will produce during the summer and early autumn periods when white clover and ryegrass are relatively dormant make it a grass of great value, and it should be included in a few paddocks on every farm.

Cocksfoot is also valuable, particularly on the high country, and is well worthy of inclusion, for it will produce good feed later in the season than ryegrass. Crested dogstail is also a very useful species, and its low, dense growth habit makes it worth while for filling up any thin places in the sward. Timothy is well worthy of consideration. Its exceptional palatability makes it greedily eaten by stock, so that it does not always show up in a pasture, but it is surprising how much timothy is to be seen in many of the later hay crops in the Bay of Plenty. It should certainly be sown on the peaty silts, and many experienced farmers make a practice of including 1lb or 2lb per acre in the seed mixture sown on the lighter country.

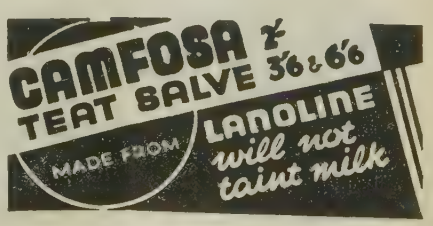
A satisfactory seeding, then, would include most of these species, and the following seed mixture is generally recommended in the Western Bay of Plenty, being, of course, modified to suit local conditions.

	Lb. per acre.
Certified perennial ryegrass	20
Certified white clover	2
Certified cocksfoot	6-8
Red clover	3
Crested dogstail	2
Paspalum (where desired)	6-8

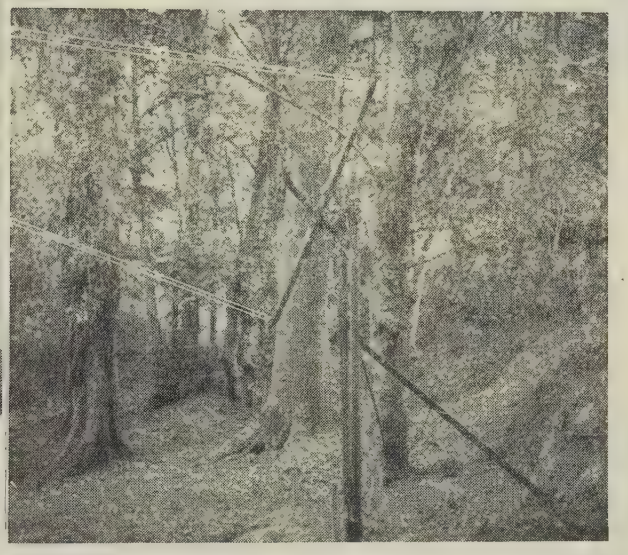
The quality of seed used is of great importance. There has been a great deal of so-called "cheap" seed sown in the Bay. Such seed is not satisfactory. In every district there are farmers who have sown down paddocks in cheap 4½d per lb seed, and in few, if any, cases has even a moderately good sward resulted.

Certified seed obtained from a reputable dealer should be sown wherever possible. The extra initial cost of such seed will be repaid to the farmer by the increased production during the first year, and he will have a lasting asset instead of an increasing liability. This point cannot be over-emphasised—a farmer cannot expect to get a high quality pasture unless he sows high quality seeds.

Another important point is the rate of seeding per acre. Many farmers sow only a very light seeding per acre, far less than the standard seeding recommended by the Department of Agriculture. Such light seedings are not satisfactory, as it takes too long to obtain a good, dense sward, and the pasture plants are spaced so far apart during the first year or two that weeds find it very easy to gain a foothold. It will pay a farmer handsomely to sow from 35 to 40lb of seed per acre, for by doing so he will obtain in the shortest possible time a dense sward of grasses and clovers.



Pumping Water by Windmill From a Gully



Above.—The windmill erected on a rise beside the plantation, showing the mechanism used. *Right.*—The pumping end of the apparatus installed in the plantation.

HOW can a windmill be made to pump water when the source of supply is in a gully and surrounded by a well-grown plantation? This is the question that some years ago confronted a farmer in the Palmerston district (South Island).

The difficulty was overcome by placing the pump over the well and connecting it by wires to the windmill, which was erected on a rise on the southern side of the plantation.

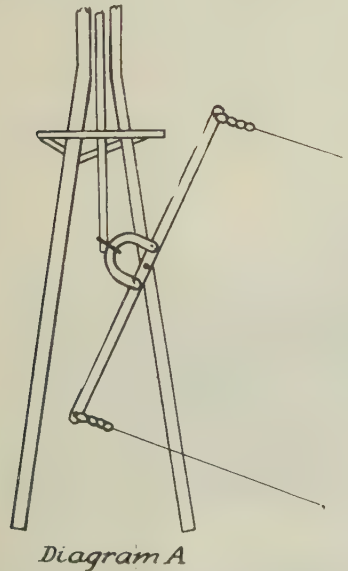


Diagram A

Diagram A: The layout of the various attachments on the windmill end of the apparatus.

The accompanying photographs and diagrams show clearly how the transfer of power from the windmill to the pump was rigged up. The following brief description will explain how the work was carried out.

Starting from the windmill end (Diagram A) it may be seen that the lower end of the connecting rod is pivoted on to the centre of a semi-circular piece of iron, which is in turn attached firmly to the centre of a wooden arm. The centre of this wooden arm is, in turn, pivoted on to a rigid support (in this case one of the windmill legs). It will be realised that this arrangement transforms the customary vertical movement into a horizontal reciprocating action.

To both ends of the arm are attached wires, which are taken through the plantation, where they are attached to a similar arm and fittings (Diagram B), thus converting the horizontal action into a reciprocating vertical movement to work the pump. This arrangement allows considerable variation to suit the nature of the constructional material available.

In this particular instance the arm on the pump end is 5ft. 2in. long, and the semi-circular piece of arm has a radius of 8½in., which works a pump stroke of 2½in. These measurements may, of course, be varied considerably. Care should be taken, however, to ensure that the relative lengths of the arm are such that the maximum pumping stroke is obtained without forcing the plunger beyond either of

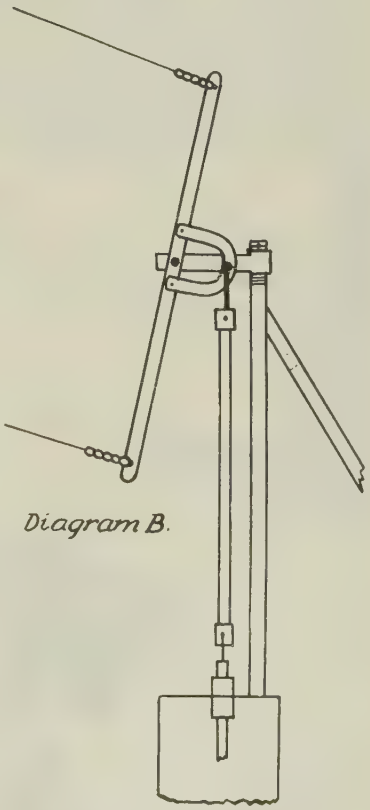
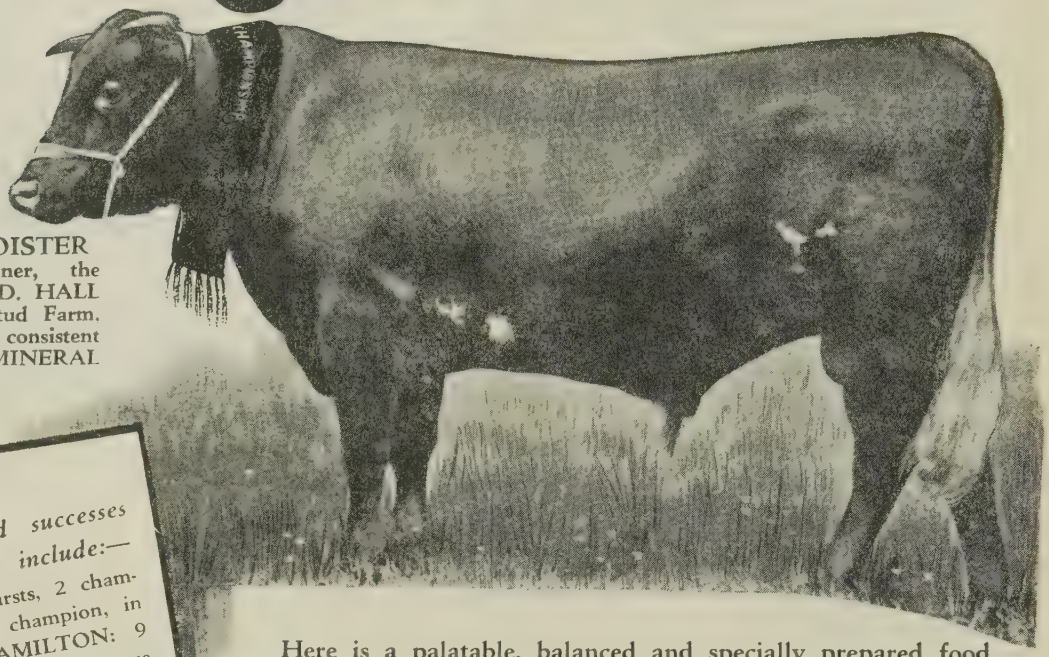


Diagram B.

Diagram B: The attachments on the pump end of the apparatus.

MORE Champions!



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"Pinedale" Stud successes during 1939-40 include:— HAWERA: 12 firsts, 2 champions, 1 reserve champion, in 12 sections; HAMILTON: 9 firsts, 1 champion, 1 reserve champion; TE AWAMUTU: 6 firsts, 1 champion; OTOROHANGA: 9 firsts, 2 champions, 2 reserve champions; CAMBRIDGE: 5 firsts and South Auckland champion cow.

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Bone Char	Calcium Phosphate	Molasses
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its limits. If the semi-circular irons are of the same size the stroke of the pump may be lengthened by shortening the pump arm, or shortened by lengthening the pump arm.

It may be asked whether the slackness in the wires due to the distance between the windmill and the pump affects the efficiency of the pump. If both wires are of the same gauge and weight, little or no efficiency is lost. The only possible loss in efficiency would be when the distance from the pump to the windmill is considerable, in which case the inertia of the wires would have to be overcome for each stroke of the pump.

In the apparatus described the windmill is about 50ft. higher than the pump, and some three chains distant.

This device has given many years of trouble-free service, the only attention required being periodical oiling of the moving parts.

This combination of pump and windmill could be varied for several sets of circumstances, such as working two or more pumps from the one windmill either together or one at a time. The number of pumps that could be worked at the one time would, of course, depend on the size of the windmill.

—S. H. SAXBY, Instructor in Agriculture, Dunedin.

Tallarook Sub. Clover Has Proved Most Suitable For Canterbury Conditions

DURING recent years subterranean clover has been sown extensively in the Ashburton County, mainly on the light to medium soil types, where a permanent sward is highly desirable. These sowings have been attended with very mixed results. Some stands have been a complete failure, a great many have been only moderately successful, while a few could be considered satisfactory.

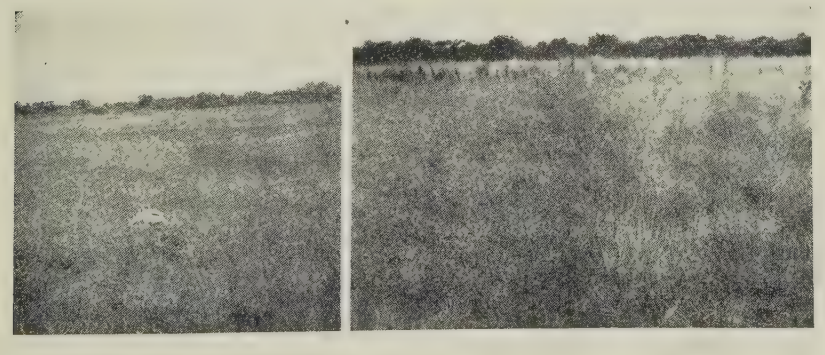
Two high leaf-producing strains. ***Left.*****—A plot of Mt. Barker.** ***Centre.*****—A plot of Tallarook.**

L. W. Gorman, photo.

Reason for Failures

The failure of this clover in many cases to stand the test when subjected to ordinary farm conditions can no doubt be attributed to a combination of several factors. The hard physical condition of much of the light land during the summer months when seeding and germination of the clover is taking place, unfavourable climatic conditions at critical stages in the growth of the plant, the sowing of large areas with consequent inability to spell from grazing during the flowering period, the failure to compete with rapidly-spreading browntop and sweet vernal, the depredations of grass grub and porina, and the lack of necessary applications of phosphates are perhaps some of the more important reasons which have tended to militate against the successful establishment and development of this clover.

Nevertheless, the results obtained in some instances have been sufficiently encouraging to warrant further sowings. A clover which is more or less permanent on the light to medium soil types of Canterbury must prove of inestimable value both from a feed point of view and also as a means of reducing cultivation costs. It is only natural, therefore, that where initial sowings have met with reasonable success, farmers will continue to include subterranean clover in their seed mixtures when grassing down. Climatic conditions will no doubt largely determine the type of response from these sowings. A wet summer will favour the growth of the clover, while a dry summer is likely to be followed by indifferent results.



A.—*Left:* Tallarook. *Right:* Dwalganup. Photo taken in November, 1938.
B.—*Left:* Tallarook. *Right:* Dwalganup. Photo taken in March, 1939.
These photos illustrate the short-lived nature of Dwalganup as compared with Tallarook. With the disappearance of clover from the sward, growth on the Dwalganup plot gradually became more rank and was neglected by stock.

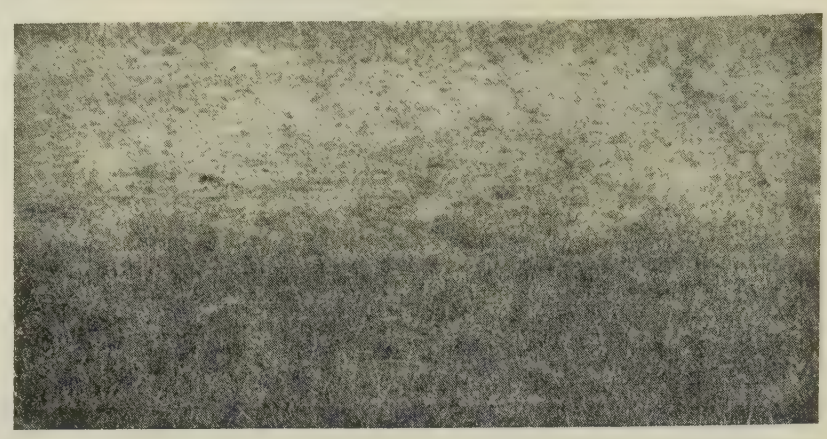
Value of Strain

The value of strain as applied to grasses and clovers is now generally recognised. It is well known that different strains of the same plant when sown under similar conditions of soil and climate may show considerable variation. Some of the poorer types are low leaf-producers, possess a temporary life and are early maturing, while others exhibit the reverse characteristics.

To determine the most suitable strain of subterranean clover for Mid-Canterbury conditions, four trials were laid down in the following districts:—Lauriston, Pendarves, Lowcliffe, and Ealing. The strains sown were Mt. Barker, Tallarook, Dwalganup, and Marlborough, and one trial also included Burnerang. Although none of these trials has yet been finalised, the results so far obtained indicate that there are substantial variations in the habit of growth of the different strains.

Dwalganup

This proved the earliest maturing type sown in the trials. When autumn-sown, it began flowering in late August and early September. Leafage production was very sparse, and because of its early flowering habit it had little opportunity of reseeding to any extent, and consequently production was confined mainly to the year of sowing.



Foreground.—White clover and perennial ryegrass. *Background.*—Marlborough subterranean clover (photo taken in October, 1939). The subterranean clover plot has been badly damaged by grass grub, while the adjacent ryegrass-white clover sward has scarcely been affected.

Mt. Barker

This may be termed a mid-early type. It produces a good bulk of leafage and flowers fairly freely. It is approximately a month later in flowering than Dwalganup, an important point in its favour, as a better opportunity is presented for successful reseeding.

Tallarook

This is a late flowering strain and a splendid leaf-producer. It tillers very well, forming a dense, leafy plant, and with crown set very low it is an ideal type for sheep grazing. It flowers at least a fortnight later than Mt. Barker, and it also flowers very profusely, producing considerably more burrs than Mt. Barker, and thus enhancing the chances of a strike from the reseeding.

Marlborough

In all trials this has proved a similar type to Mt. Barker.

Burnerang

This has been sown in one trial only, and the results so far are not very encouraging. The leafage production does not appear to equal that of either Mt. Barker or Tallarook.

From a practical point of view a heavy leaf-producing, late-flowering strain is highly desirable for Mid-Canterbury conditions, and Tallarook fulfils these requirements better than any strain yet tried out. In the trials Mt. Barker has proved definitely superior to either Dwalganup or Burnerang, and should be sown where the seed of Tallarook is not available.

—G. K. McPHERSON, Instructor in Agriculture, Ashburton.

Many young cattle have been affected with both stomach and lung worms during the autumn, states the annual report of the Director of the Livestock Division. Much advice has been given as to the feeding and drenching of the affected stock. The bluestone-nicotine drench continues to give good results in both dairy and run cattle, but the importance of adequate feeding is not overlooked.

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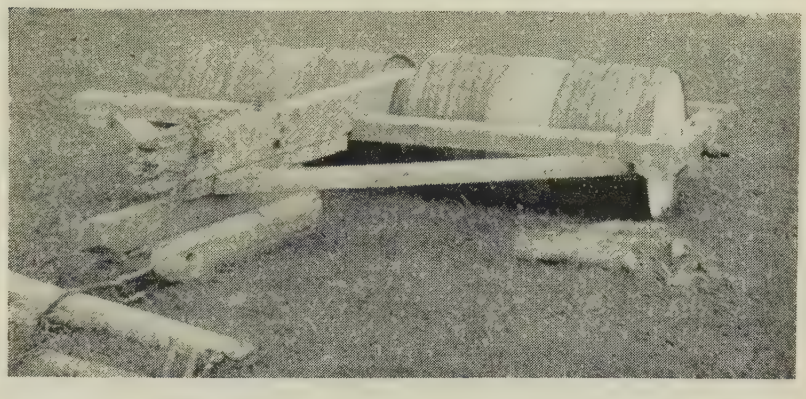
A Useful Home-made Roller

PART of the f rm of Mr. G. Anderson, of Matakana, consists of rather heavy clay flats with poor natural drainage. After the winter stocking, when the land begins to dry out in the spring, the fields are invariably very badly pugged by tramping, and consequently are very uneven and difficult to mow when used for hay or ensilage.

In order to level the surface Mr. Anderson decided to try the effect of a heavy rolling in the spring, choosing a time when the ground would be beginning to dry out and just in the right order to derive the most benefit. As the rolling was largely in the nature of an experiment, the purchase of a roller was scarcely justified. Neither could one be borrowed, as rollers are not commonly used in the district. Moreover, the operation called for a smooth roller, and one which would be exceptionally heavy in proportion to its diameter, to ensure the maximum levelling effect.

It was obvious that low cost was scarcely compatible with this specification, so Mr. Anderson decided to make one for himself. As will be seen from the illustration, the roller has been constructed from two iron drums. These were filled up solid with concrete, and provision for a through axle was made by placing a length of piping up the centre of each drum before filling in the concrete. The axle itself is made from a length of 1½in steel shafting taken from an old top-dresser. This is simply inserted through the iron piping, bearings being provided at the middle and at each end. As will be seen from the illustration, the framework has been constructed from timber, provision being made in front for a sledge foot to prevent any tendency for the roller to over-run the horses, which might result in "digging in."

This roller has now been well tested out for a number of seasons, and has proved extremely satisfactory. Being in two sections, it turns easily without damage to the turf. As it weighs approximately one ton, and as the circumference is relatively small in proportion to the weight, the result is a correspondingly high pressure, which very effectively levels out the pugged-up ground. The roller can be pulled by two horses, but, because of its weight, three horses are to be preferred for a full day's work.



The roller described in this article. Note the provision made for a central bearing to prevent bending of the axle and the sledge foot in front to prevent 'digging in."

Mr. Anderson emphasises that the success of the rolling depends largely on the choice of the proper time. If the ground is either too wet or too dry, the work obviously cannot be satisfactory. Apart from levelling the ground, the rolling has also greatly benefited the pastures, as depressions which would normally lie full of water, are thus filled in and become quickly grassed over, greatly improving the density of the sward.

—P. S. SYME, Instructor in Agriculture, Warkworth.

Answers to Correspondents

Growing Swedes Twice In Same Ground.

"SUBSCRIBER" (GISBORNE)—

I am writing for information on growing swedes a second time on the same ground, as in this district they often get the brown-heart and are a failure even if borated super is used. I would also like to find out if any of the softer varieties of turnips are less liable to this disease.

FIELDS DIVISION—

The risk in growing swedes on the same ground twice is in the stronger reinfection liable to occur from disease, particularly dry-rot and club-rot.

With early sowings, dry-rot with secondary wet-rots developing is usually more prevalent with the earlier sown crops. Brown-heart is satisfactorily controlled with borax, and some farmers broadcast up to 10 lb. per acre before sowing. The recommendation is to broadcast at least 20 lb. per acre and sow basic super or borated basic super every second coulter with the swedes. Pre-drilling or broadcasting borax and super does not affect germination, and may be done just before sowing, but when drilling seed and manure basic super is less liable to cause germination injury, and the quantity of borax sown with the seed must be kept down for the same reason.

When sowing with the seed every second coulter 8 lb. of borax with 2 cwt. of basic super per acre is recommended. Heavier sowings are liable to reduce germination unless the seed is sown every coulter, which halves the fertiliser in contact with the seed. Sowing time is during December.

Swedes and turnips are both liable to be affected by brown-heart, but turnips are fed off at an early stage of maturity. Some swedes are more resistant to dry-rot, brown-heart, etc., than others. Vilmorine has proved resistant, but is hard, white fleshed, and fangy rooted. Often a little chou moellier is sown with the swedes, or as a crop instead of swedes. The same recommendations with regard to fertiliser would apply.

The Orchard and Vineyard

Contributed by the Horticulture Division

Orchard Notes

Packing the Apple Crop

AS the gathering of the apple crop will be in full swing by the time these notes appear, it may be as well to remind readers that valuable information will be obtained by perusing the "Journal of Agriculture," Vol. 55, Nos. 5 and 6, pages 265-273, November, and pages 338-348, December, 1937. In these "Journals" a very valuable article by Messrs. Hyde, Douglas, and Binfield was published. The article is well illustrated, and deals in a comprehensive manner with the main points in regard to picking, handling, grading, and packing of apples and pears. The article has been reproduced in leaflet form, and can be obtained by application to the officers of the Department of Agriculture.

The accompanying illustrations show two well-packed cases prepared for export, Fig. 1 showing the 3-2 pack, and Fig. 2 the 3-3 pack.

As previously indicated, the following points should be borne in mind by fruitgrowers:—

(a) Do not pick and pack immature fruit, as it does not appeal to the consumer and is likely to cause consumption to decrease.

(b) Do not leave fruit on the tree after it has reached the full stage of maturity, as it is not likely to keep, and some varieties quickly lose their flavour.

(c) Make as many pickings as are necessary to obtain the maximum flavour combined with maximum production.

(d) Grade and pack and dispatch all fruit as soon as possible after it has been gathered.

(e) While always endeavouring to have sufficient fruit in the packing shed to enable the work of packing to proceed on wet days, take care to avoid fruit being placed in a position in the shed where it may be overlooked for some weeks and consequently deteriorate.

Pack 3-2.

Rows, 6-5
Layers, 5.
Count, 138.

Rows, 6-6.
Layers, 5.
Count, 138.

Hints to the Beginner

Packing is really a simple process, and almost anyone can, with a little practice, become acquainted with the method of bringing the fruit to the correct height in the case. The first point is the correct method of placing each apple in the first layer, which is really the foundation of the pack. The beginner should practice slowly with a few boxes containing each size until he has mastered the system. Speed will come after a time, but the aim should be to have each case neat and attractive.

The cubic capacity of the standard apple case without a bulge is 2173.5 cubic inches. The minimum bulge of half an inch adds 50 cubic inches, making a total of 2223.5 inches or one Imperial bushel. The maximum bulge of 1½ inches adds 150 cubic inches. The bulge should be from 1 to 1½ inches above the top at the centre, but not more than half an inch at the ends.

Important Points

The security of the fruit depends upon the bulge, which, if properly formed, secures the snugness of the contents in all stages of transport. Important points to remember are:—

(1) The diameter of the apples is measured from cheek to cheek, not from stem to eye.

(2) All apples should be placed on the cheek, producing an even surface on each layer.

(3) The size of the pockets regulates the height of the fruit.

(4) Correct placing of the first layer is the most important factor in securing the correct height.

(5) The second and alternate layers in each pack must not rest directly on top of the fruit beneath, but in the spaces. Keep each apple over the pocket formed by the layer beneath, so that no two fruits rest directly on top of each other.

(6) Slack packing results in bruised fruit and consequent reduced prices.

(7) Stack the cases on their sides, not on the bulge.

Spraying

During the rush of harvesting there is a tendency to neglect spraying. As was pointed out in last month's notes, this has often proved disastrous. All the later varieties should be watched for late infection of black spot, *glomerella* and brown rot, and also codling moth and leaf roller caterpillar. It is usually some time during March that the spray pump can be put aside for a short time.

Miscellaneous

There are always a number of minor operations to perform in an orchard at all seasons of the year. Here are a few reminders:—

Pack 3-3.

Rows, 6-5.	Rows, 5-5.
Layers, 6.	Layers, 6.
Count, 198.	Count, 180.

(1) Watch young growing grafts on trees which have been topworked. Suppress most, if not all, of the young growth which breaks on the old stock.

(2) Inspect young buds that have been inserted and loosen the ties where necessary.

(3) Pinch back or remove all water shoots growing in the centre of trees from which large limbs were removed the previous winter.

(4) Mark any trees which have been infected with silver blight.

(5) Gather up and destroy all diseased fruit around the trees. Remember that sanitation in the orchard is most important.

(6) Give support to any heavily-laden branches so as to avoid their being broken.

—L. PAYNTER, District Supervisor, Auckland.

A Further Talk with Mr. Greig About Starting a Citrus Orchard

"WELL, Mr. Smith, how have you been getting on? Managed to get a suitable place yet?"

"No. To tell you the truth, I've been around and seen all sorts of places, but nothing quite what I am looking for. By the way, what is your idea of the most suitable age at which to start citrus growing?"

"I should say any age up to 50, but not as a job to retire to."

"Why not, Mr. Greig, many people gave me the idea that citrus growing was a most congenial occupation after a lifetime in an office."

"So it is, if you don't go in for it commercially and have only a few trees for a hobby. It is imperative that the trees be carefully tended and kept free from all pests and diseases which might spread to other orchards, particularly so in commercial citrus-producing areas."

"You know, my idea in getting a place is so that my son Jack, who is over in Egypt, will have some place on which to settle down when he comes back. I just want the groundwork done before he returns. What course could he go through before actually starting on the orchard?"

"Unfortunately, Mr. Smith, there is no definite course in fruitgrowing established in this country, but I would suggest that he start as a general hand on a good mixed orchard. By that means he would get a working knowledge of orchard practices. At the same time he should endeavour to gain the general principles of horticulture. After a year or so on the orchard for experience, a similar time spent in a nursery would be well worth while. Not only would he then know the different varieties of fruit trees, but also the principles of budding and grafting trees and raising nursery stock. If he was interested, I would also suggest that he endeavour to get a Diploma in Horticulture which would give him a definite standing in such work."

"I didn't know, Mr. Greig, that there was such a course available in New Zealand."

"Oh, yes, there is, although it is not yet as well known as it ought to be. By the New Zealand Institute of Horticulture Act, 1927, a definite course was laid down so that anyone desiring to obtain same could work through a course. The procedure is first of all to write the Dominion Secretary, Royal New Zealand Institute of Horticulture, P.O. Box 1237, Wellington, and be enrolled as a student. This should be

done early in the year. Then it is necessary to have the nursery approved as a suitable training centre. There are three examinations, junior, intermediate, and senior. The course takes six years, two years for each examination. The junior examination covers the general classification of plants and the life histories of common insects, etc. The intermediate and senior examinations cover the more general principles of horticulture, soils, disease recognition and control, and so on. However, that is by the way just now; tell Jack that I'll give him a hand if he is interested.

"In the meantime, about your choice of a place. Take your time and get what you want on the lines of our previous talk. Don't forget the area must be easily worked and easily sheltered. Semi-tropical conditions are practically essential for citrus culture. By the way, you may become interested in a partially developed orchard. If you do, always have a good look at the trees and don't take on more than you can handle until Jack returns."

"What is doing in citrus orchards now?"

"During March growers will again be applying their oil sprays, keeping ground in good tilth, and purchasing autumn manures. Putting on the summer certified oil sprays is very important, as these are the best months of the year to kill sucking insects, the worst of which is citrus red scale. The strength is 3 per cent., that is, 3 gallons of oil to 100 gallons of spray mixture. Suitable cover crops to sow are blue lupins, 1½ bushels per acre; oats at the same rate or mustard at 20 lbs. per acre."

—A. M. W. GREIG, Citriculturist, Auckland.

A well-sheltered lemon orchard, Henderson, Auckland.

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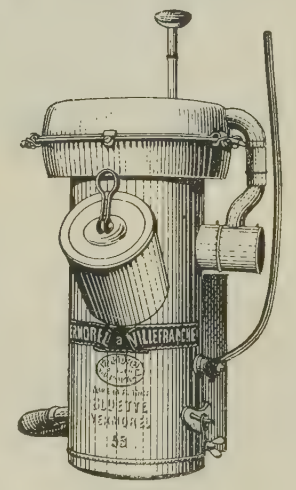

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Cool Storage Notes

Apples in Cool Storage

POINTS on the treatment which has been found to be beneficial when dealing with fruit for cool storage are:—(1) The most suitable storage temperature for varieties of apples such as Cox's Orange and Kidd's Orange Red is from 36 degrees to 38 degrees Fahrenheit; (2) such varieties should be stored for only short periods, and in popular sizes; (3) large fruit should not be cool stored; and (4) fruit placed in cool storage should be properly matured, but not over-ripe.

Jonathan.—A popular, mid-season variety, Jonathans should be harvested when matured and well coloured, and placed in cool storage immediately they are packed. This variety is subject to flesh collapse and soft scald if held at flesh temperatures under 38 degrees F., and also deteriorates if held in cool storage after early July. Counts of 163 and smaller, if picked when well coloured early in March and held at a flesh temperature of 38 degrees F. and relative humidity of 85 per cent., will hold up in good condition for this period. The larger sizes are not dependable for other than short storage.

Sturmer.—When grown under normal conditions, this variety is suitable for long storage. The type of soil, seasonal conditions, and the orchardist's manurial treatment of the soil are contributing factors to the defects which develop in this variety during cool storage. Sturmers should be placed in cool storage as soon as possible after they are harvested, and should not be too quickly reduced to the required temperature. Cool storage temperatures, when reduced below 36 degrees, are detrimental and likely to influence the development of flesh collapse.

Brighton.—This variety is subject to the development of soft scald if the cool storage temperatures are reduced lower than 36 degrees F.

Washington.—Washington apples are not suitable for long storage, as they have a tendency to develop superficial scald.

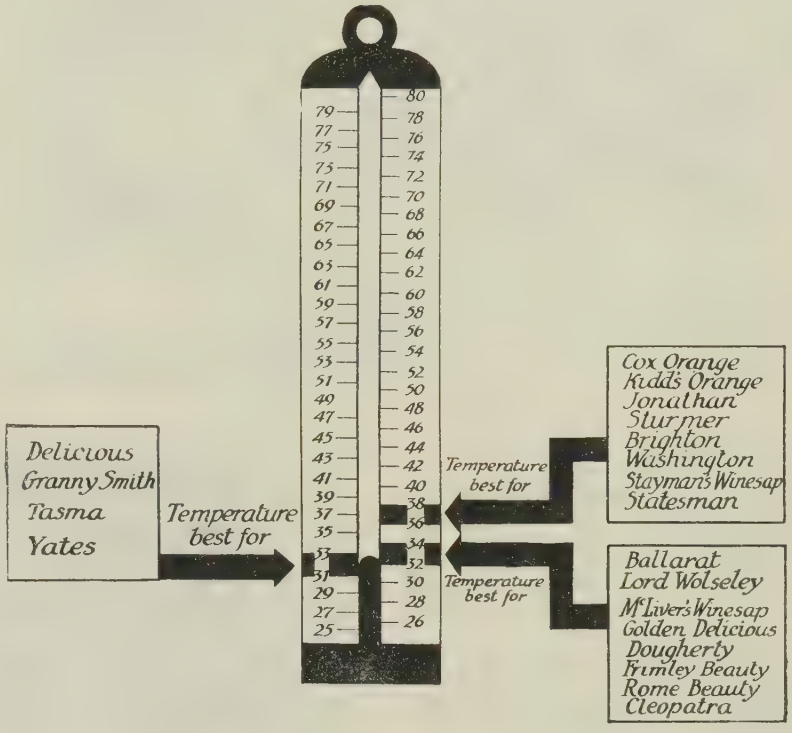
Stayman's Winesap.—This variety is subject to breakdown tendencies in cool storage, and should not be subjected to lower temperatures than indicated by the chart.

Statesman.—This variety is not recommended for long storage.

Ballarat.—A delay of ten days after harvesting and before packing and placing in cool storage is beneficial in the control of external discoloration. The large sizes should not be held for long storage, as the variety is subject to the development of flesh collapse during cool storage.

Apple Temperature Chart

Note: To preserve the natural bloom of apples and prevent wilting, 85-90 per cent. relative humidity is beneficial.



Important Points for Long Storage

(1) Most varieties of apples should be placed in cool storage as soon as possible after they are harvested. Varieties that give better results if held after picking before cool storage are Granny Smith and Ballarat, but care must be taken not to delay storage beyond the time recommended.

(2) Cool storage temperatures should not be permitted to fluctuate more than 2 deg. above or below the optimum flesh temperature for each variety.

(3) Apples and pears should be stacked in cool chambers in a method which will allow for the inspection of each line of fruit at regular intervals during storage. This precaution will do much to prevent wastage and financial loss.

(4) The cool chambers should be ventilated at regular intervals to prevent the accumulation of carbon dioxide gas.

Lord Wolseley.—This variety should be harvested when matured, wrapped in oil wraps, and immediately placed in cool storage.

Frimley Beauty and Rome Beauty.—These varieties should be matured and well coloured when harvested, and immediately placed in cool storage. Both are subject to superficial scald, and should be kept under close observation.

McLiver's Winesap and Dougherty.—These varieties should be harvested when matured, and immediately placed in cool storage.

Cleopatra and Golden Delicious.—Should be harvested when matured and immediately placed in cool storage. The large sizes should not be held for long storage.

Delicious.—This variety should be harvested when matured and immediately placed in cool storage. Late picking and a delay in placing Delicious in cool storage causes the fruit to become mealy and soft, and also encourages the development of fungal rots and internal discoloration during storage. When left on the trees too long under wet weather conditions, glassy core is liable to develop, and under such conditions this variety will not keep well in cool storage.

Granny Smith.—This valuable apple requires careful treatment if it is to be held in cool storage for a long period. The fruit should be harvested before any change in the ground colour has taken place, but not in an immature condition. It is very susceptible to superficial scald, and during the past season considerable loss resulted from soft lenticel rots which developed early in August. Past experience has indicated that the development of external discoloration or superficial scald can be almost completely prevented by holding the fruit after picking in a well-ventilated stack in a cool, sheltered position on the orchard for from ten to fifteen days. This fruit should then be wrapped in oiled wraps and immediately placed in cool storage chambers held at a temperature of 31 to 33 degrees F. The oil wraps also assist in the prevention of the development of soft lenticel rots.

—A. POWELL, Cool Storage Officer, Wellington.

Viticulture

CIDER MAKING

(Continued from the January issue.)

WHICHEVER type of press is used, the pressure should be applied gradually and slowly in order to allow the juice, which cannot be compressed, to escape. Pressure applied too suddenly will have the effect of hardening the outer layers of the pomace and retaining the juice.

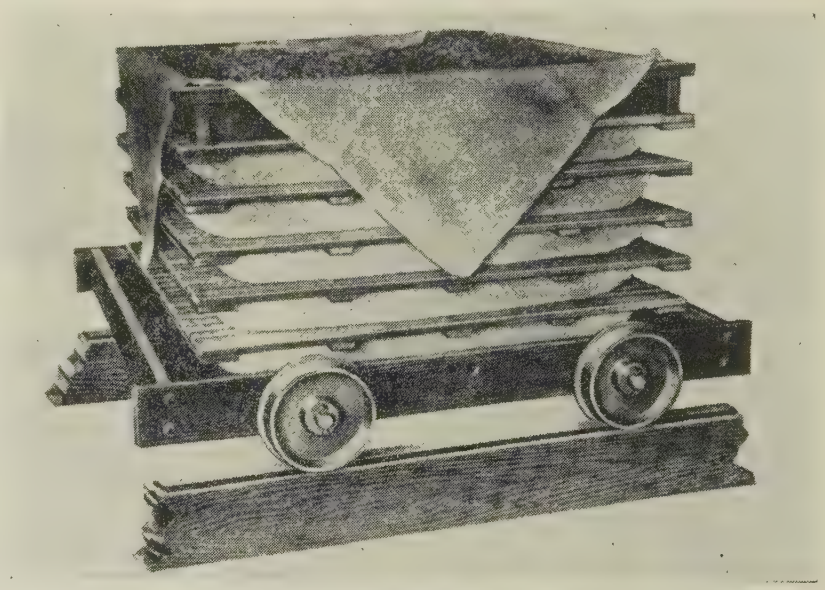
Using a mill of the grater type in combination with a suitable hydraulic press, a ton of fruit should yield about 165 gallons of juice, or a little over three gallons to the bushel.

Suitable cider mills and presses are procurable in New Zealand, and the names of the manufacturing firms and particulars can be obtained from this Department.

Preparation Of the Must

The apple juice flowing from the press-cloths is generally fairly clear, although not entirely free from visible solids. To remove these it is advisable to run the juice through a couple of hair or stainless steel sieves, the lower one having a finer mesh than the one placed immediately above it; on no account should tinned or galvanised wire sieves be used. The juice thus treated will be sufficiently clear to run directly into ordinary barrels to be fermented or to be pumped from a temporary or specially constructed receptacle beneath the press into fermenting-vats in the cellars.

When sufficient juice has been conveyed into the fermenting-vessel, and before any fermentation sets in, the quantity of solids (Baume) contained in the juice should be ascertained and duly recorded on the vessel itself or in a book kept for the purpose. There are small quantities of substances other than sugar included in the total solids, but for practical purposes the whole can be considered as sugar.



The method of building up the cheese.

Some orchardists may possess a Baume hydrometer with a scale from 0 degrees to 50 degrees for liquids heavier than water. The same hydrometer can be used for testing the density of apple juice. Such an instrument can be procured from one of the scientific instrument dealers, together with a test-glass, for a few shillings. If purchasing a Baume specially for cider-making it is preferable to obtain one graded from 0 degrees to 20 degrees or 25 degrees. The degrees on these are further apart on the scale, and are therefore easier to read correctly.

The Baume is graduated at 60 degrees Fahr. (15 degrees C.), and the juice to be tested should be as near as possible to that temperature. Should the temperature be above 60 degrees Fahr., add 1 degree to the degree Baume recorded for every 15 degrees Fahr. above 60; or, if below, deduct 1 degree Baume for every 15 degrees Fahr. below. Read the degrees Baume in a line with the main surface of the liquid, not at the point it has mounted to on the spindle by capillary action.

The Baume hydrometer is an arbitrary scale as far as cider is concerned, but, as already mentioned, it is generally to be found in the hands of the orchardists or is easily procurable.

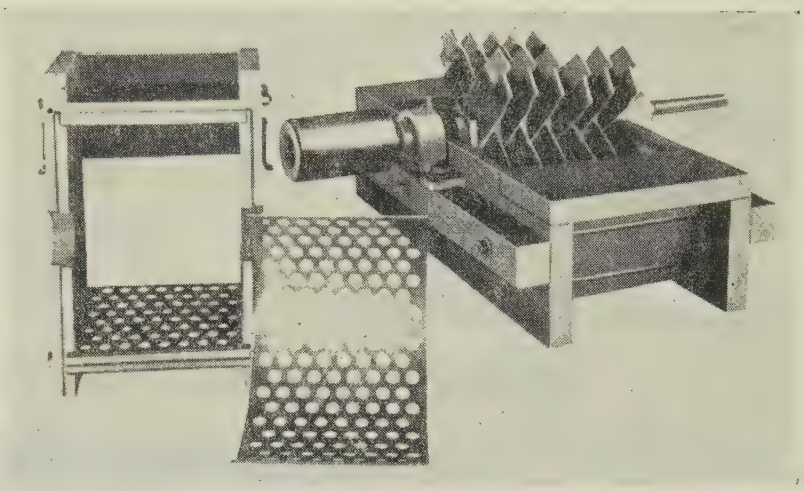
By a happy coincidence the degrees Baume (varying as a rule from 6 degrees to 9 degrees) in apple juice, if reduced by 1, will give approximately the degree of alcohol the cider will contain on complete fermentation. (Wine-makers will notice that the approximate ratio of sugar to solids in apple juice is not the same as that in grape juice). Apple juice registering 8 degrees Baume will result in a dry or hard cider containing very near to 7 per cent. of alcohol by volume, which is equal to 12.25 per cent. of proof spirit.

The term "degree of alcohol" means percentage by volume.

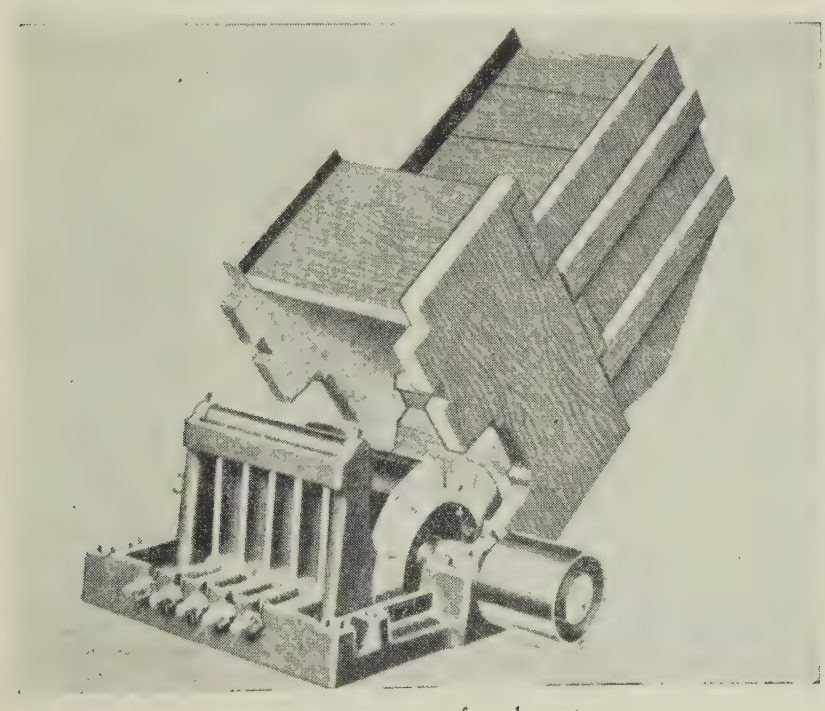
The sugar-contents of the must can be gauged more exactly by analysis, but the exact amount of alcohol that will be produced in the cider cannot be forecast exactly, as it will be rarely found that two barrels of juice, although made from the same varieties of apples, are of exactly the same composition, nor will they ferment out under similar conditions. The indications obtained by the use of the Baume hydrometer, as already explained, will be found on the analysis of the completely fermented cider to be very nearly exact—quite near enough for ordinary purposes.

Should the saccharine-content of the must be insufficient to produce the alcoholic strength desired in the finished cider, then for each additional 1 degree of alcohol desired add 3¾ oz. of No. 1A cane-sugar to each gallon of must, dissolving it thoroughly by stirring. If, on the contrary, a lighter cider is required for quick home consumption after making, water can be added to reduce the solids. Only small quantities of either sugar or water should be employed; an excess of either will alter the nature of the beverage. An addition of both sugar and water would constitute the fraud known among wine-makers as "stretching" or "sophistication."

The proportion of acidity in ripe New Zealand apples is generally suitable for making a good cider, and can be judged approximately by taste. The exact proportion need be ascertained only when making cider on a commercial scale, and will be dealt with later. New Zealand apples are usually low in tannin, and an addition of 2 oz. per 100 gallons is recommended before fermentation, and a further addition of 2 oz. per 100 gallons after fermentation has ceased and the cider has been racked.



The hammer type of apple pulper.



A large power type of apple grater.

Classification Of Tannins

There are a considerable number of different tannins, which are further divided into sub-groups. However, it is not necessary to deal with these different types of tannin, and it will be sufficient if it be clearly understood that when the term "tannin" is used in conjunction with cider-making operations it indicates one specific variety of tannin, namely, oeno-tannin, "a natural tannin derived from the vine and its fruit," or, as it is more commonly called in New Zealand, "pure grape tannin." This tannin does not cause any harshness; on the contrary, its use under certain conditions will reduce the harshness in cider. One of the virtues of oeno-tannin is that, unlike other tannins, it is not decomposed by fermentation to break up into glucose and gallic acid. As tannin is a natural ingredient of apples, it follows that in the ordinary process of manufacture the cider will obtain a certain amount of its requirements during fermentation. However, as stated above, because of the climatic conditions ruling in New Zealand the apple itself is deficient in tannin, and the addition of this substance is necessary. Oeno-tannin is obtainable in New Zealand, and the names of those firms supplying this material are obtainable from this Department.

—*B. W. LINDEMAN, Vine and Wine Instructor, Auckland.*

(To be continued.)

The Home Garden

Vegetables, Small Fruits and Flowers

Storing Vegetables for Winter Use

AUTUMN is generally a busy time in the garden. As the days shorten it is found more and more difficult to get the work done. Time must be found to attend to the crops which need to be harvested and which, if properly harvested and stored, will remain in good condition throughout the winter months, when they form a valuable addition to the foodstuffs of the home. Harvesting is an important part of the gardener's work, and should be undertaken when the crops reach the correct stage of maturity.

In the following notes a brief account of the harvesting and storage of the main vegetable crops is given.

A crop of marrows stored in cases under trees.

Seed Crops

Beans.—Beans, such as haricot and lima, which are allowed to grow to maturity, should be harvested when the pods are ripe and the seeds are firm. In large areas the whole plant may be lifted, allowed to dry in the sun and air for a few days, and then stored for several weeks in a rain-proof stack or shed to mature before thrashing out the seed. In smaller areas the pods may be picked as they ripen, and, after drying, the beans are shelled. After thrashing or shelling the beans should be dried off thoroughly, when they may be stored in bags in a dry place.

Peas.—Marrowfat peas and surplus peas of varieties used as a green vegetable during the summer should be harvested as the bulk of the pods ripen, and, when thrashed, they form a valuable winter vegetable. They should be treated in much the same way as beans. The large seeded marrowfat varieties produce very good dried peas.

Bulbous Crops

Onions.—The onion bulbs are ripe when the tops have fallen and are turning yellow. When this stage is reached there should be no delay in lifting, as a period of wet weather may start them into growth again. The bulbs should be lifted from the ground and left there for several days, so that surplus moisture may dry out. They should then be transferred to a dry, airy shed to dry completely before being cleaned of surplus scales. Any unsound bulbs should be set aside for immediate use, and the others stored in a cool, dry, airy shed. It is important that air should pass freely between the onions in the store. In small quantities the bulbs may be "strung" and suspended from rafters in a suitable shed. In such a position ventilation is generally ideal and the bulbs keep well.

Shallots, Perennial Onions, and Garlic.—These should be treated much the same way as onions. Shallots and garlic are very good keepers, but

Seasonal Don'ts

Don't

allow vegetables which will form valuable food during the winter months when food from the garden if often in short supply to go to waste. Those vegetables which should be lifted and stored should receive careful attention. They should be lifted at the correct stage of maturity, should be trimmed properly, and should be stored according to the requirements of the particular crop. The information is given in this "Journal," and requires careful study so that the crops which are normally stored will deteriorate to the least possible extent.

Don't

leave any cover where slugs and snails can breed. The young, which generally hatch with the autumn rains, are those which will be numerous on crops during the winter and spring. Rubbish should be dug under if it will rot, otherwise should be burnt. A green manuring crop may harbour slugs, snails and such vermin, but when it is dug under these are dug in with it and most of them are destroyed.

What to Do in the Home Garden Next Month

Summary of Operations During March

VEGETABLE SECTION.

SUCCESSIONAL SOWINGS.

Peas (early dwarfs—final sowings), lettuce, radish.

OTHER SOWINGS.

Carrots (shorthorns for Sept.-Oct.), endive, cauliflower (for spring and summer), onion (in cool districts sow late in March and in warmer districts early April, but not later than the middle of April), spinach (prickly-seeded for late autumn and early winter), swede (for use June-Sept.).

SEEDLINGS TO TRANSPLANT.

Endive, lettuce.

SPECIAL NOTES FOR WARM DISTRICTS.

Sow globe beetroot for winter, and turnips for autumn and winter. Sow spring onions about the end of the month.

SPECIAL NOTES FOR COLD DISTRICTS.

Transplant December-sown spring cabbage. Sow onions for spring planting about the middle of the month.

PERENNIAL CROPS.

Few suggestions can be offered in this connection, but with the decreasing length of day and amount of light the spacing of the plants should be such that they do not crowd one another as they develop.

Asparagus—Remove and burn shoots bearing berries before they ripen.

Rhubarb.—Remove flowering stem.

CROPS IN SEASON.

(The month in brackets represents the month of sowing the seed.)

Salads.—Lettuce (Dec.-Jan.), radish (Feb.), corn (Dec.), tomatoes (Aug.), cucumbers (Sept.), celery (July-Aug.), spring onions (Dec.), capsicums and egg fruit (Aug.).

Greens.—Beans (Dec.), marrows (Oct.-Nov.), peas (successional early dwarfs), New Zealand spinach (Oct.).

Roots.—Beetroot (Sept.-Oct.), carrots (Sept.-Oct main crop and Nov.-Dec. shorthorns), parsnips (Sept.-Oct.), onions (main crop), pumpkin and squash (Oct.), salsify (Oct.), turnips (Jan.).

CROPS IN STORE.

Onions, shallots, potato onions, potatoes, kumaras (only if suitably stored).

GENERAL WORK.

Earth up celery and leeks. Celeriac does not require this treatment.

Clean up any rubbish and so eliminate unnecessary places where slugs, snails and slaters can find shelter. Burn potato haulms and tomato vines promptly after the crop has been harvested, but bury anything else or place it on the compost heap.

Pay strict attention to the control of weeds which, while small and easily destroyed, will make rapid growth with favourable weather.

Lift kumara runners.

SMALL FRUITS SECTION.

Proceed with the preparation of land (if not already done) for new plantings.

Plant strawberry runners (see paragraph in this "Journal").

Raspberries, Loganberries, etc.—Repeat the sprayings recommended last month to control cane-wilt and bud-moth.

GLASSHOUSE SECTION.

The cover crop in the tomato houses may be dug under in preparation for autumn planting.

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potato onions should be used promptly, as they do not keep well.

Tuber Crops

Potatoes.—The main crop of potatoes is mature when the skin of the tuber is firm and will not rub off freely. In warm, humid districts, where re-growth is likely, the crop should be dug promptly on reaching this stage. The tubers should be left on the ground only until they dry off. Twenty-four hours in a drying wind is usually sufficient. They should then be picked up, sorted, and stored in a clean, cool, dark, ventilated shed in clean sacks, bins, or boxes. In larger quantities they may be stored in a clump on drained ground, where the tubers should be stacked on a pile of brush or straw and covered with similar material, with straw or old sacks placed in position to run off the rain water. When severe frost threatens a covering of several inches of soil should be added.

Kumaras.—The digging of kumaras should be delayed as long as possible so that maximum growth may be made, but it should be completed before frosts occur. When digging, the tubers should be handled very carefully. They bruise readily, and, if bruised, do not keep well. After digging, the tubers should be left on the ground for several days so that the surface may dry out completely. During this time it is a good plan to stack them in the field and cover them at night or during wet weather with their tops or with sacks. When the tubers have undergone preliminary sweating—usually taking about a week—they should be taken to the store. The essential conditions of the store are that it be cool (but not cold), dry, and free of draughts, and vermin-proof. A shed or a pit dug into dry ground is quite suitable. In these positions they may be stored loose or embedded in dry sand or sawdust. In larger quantities they may be clumped in much the same way as potatoes.

Root Crops

Certain crops, such as parsnips, salsify, celeriac, autumn-sown carrots and beetroot, which do not deteriorate when left in the ground, do not require lifting and storing unless the ground is required for further planting.

Carrots.—The main crop of carrots, sown September-October, should be lifted before frosts occur, as otherwise they are liable to deteriorate. They become coarse and woody, and cracks which occur cause a considerable disfigurement. Only the sound specimens should be stored, the others being set aside for immediate use. Carrots store very satisfactorily, and do not shrivel if embedded in moist sand or soil. Before storing, the leaves should be cut off close to the top of the carrot.

Beetroot.—Like carrots, the main crop of beetroot deteriorates if left in

the ground during the winter. Beetroot must be handled very carefully, otherwise bleeding will occur. The leaves should be twisted off at a hand's width from the root to avoid bleeding. The roots should then be stored in much the same way as carrots, in moist sand or soil or in heaps covered with straw and soil.

Pumpkins and Marrows

Pumpkins and marrows which are allowed to grow to maturity should be removed from the field before frosts occur. Both crops are mature when the skin is firm. They should then be severed from their vines and left in the field for several days to harden off completely before removing them to the store. These crops may be stored satisfactorily in a shed or barn or under trees where frost does not penetrate. The soft-skinned varieties should be placed in a single layer to prevent crushing, but the hard-skinned varieties may be stored in low piles. The illustration shows a crop of marrows stored in cases under trees.

Planting and Manuring Strawberries

DEEP and thorough cultivation is essential before planting strawberries. In the northern districts, because of the prevalence of weeds and virus diseases, the strawberry crop is grown as an annual. In the cooler southern districts the plantings may remain down for two or three years.

The annual crop is generally grown in rows 2 ft. apart with the plants 9 in. apart in the rows, and the longer-lived crop in rows 30 in. to 3 ft. apart with the plants 9 to 15 in. apart.

The most suitable manure to apply for most purposes is 2 parts of blood and bone, 2 parts superphosphate, 1 part sulphate of potash, and, if the soil is not rich in humus, 1 part of sulphate of ammonia. When grown commercially, the annual crop may receive up to 30 cwt. per acre of this mixture per year, and the perennial crop about 12 cwt. It is usual to apply these amounts in three equal dressings

Strawberry plants before and after trimming.

[D. Ofen, diagram.

—one broadcast before planting, one several inches below the plants at planting time, and the third in two dressings in August when spring growth begins. These dressings may be followed by a dressing of 2 cwt. of sulphate of ammonia and 3 to 4 cwt. of guano per acre in October before mulching.

At planting time (February to mid-April in cool districts; February to mid-June in warm districts; and the last week in August in very cold districts) the plants should be trimmed as shown in the illustration. The roots should not be allowed to dry out. The roots, and not the crown, should be placed below ground.

The most vigorous runner-plants are those taken from plants which have not borne fruit.

—F. SYDENHAM, Assistant Horticulturist (on Active Service).

Work of Horticulture Division

ONE of the most important phases of the work of the officers of the Horticulture Division is the affording of advice and information on the many problems confronting the grower in connection with fruit and vegetable growing and horticultural matters generally, states the annual report of the Director of the Division. The demand for guidance on these subjects has increased considerably, and every effort has been made to meet such requests by correspondence, lectures, and demonstrations and by personal visits to orchards, gardens, etc.

A great deal of the improvement that has taken place in the grading and packing of fruit for the market is due to the classes on these subjects conducted by the orchard instructors in the main commercial centres during the winter months in co-operation with the fruitgrowers' associations. The opportunity thus given of obtaining the departmental certificate of competency in apple grading and packing is fully appreciated by those attending the classes. The same applies to the examinations held for the certificate in orchard pruning and spraying.

The instructors also make a point of attending district meetings of the local branches of the New Zealand Fruitgrowers' Federation, Ltd., and affording any information of a general character that may be required.

The Division has again co-operated with the Department of Scientific and Industrial Research in the carrying out of orchard research work, and the manurial and root-stock trials have reached a further stage of development. Orchard cover-crop experiments are also included in the programme.

For the purpose of demonstrating up-to-date methods in small-fruit production, pruning and manuring, and experiements with raspberries, gooseberries, and black currants were inaugurated in the Greytown district. A raspberry varietal trial, comprising some 22 varieties obtained from various districts in the Dominion, was also established in the same locality, and the results will be watched with interest.

In the spring the first cutting was taken from the asparagus test plot established on the Napier Lagoon reclamation, the crop being disposed of at a satisfactory price.

An additional 1½ acres have been planted is asparagus, with the view of further testing out the suitability of the large area of reclaimed land for this and other vegetable culture.

How to Forward Specimens From the Orchard and Garden For Examination

When specimens are forwarded for examination it is important that suitable specimens should be selected and that they arrive in good condition. The examination of specimens of horticultural crops is an important service of the Horticulture Division. Parcels should be addressed to the Director, Horticulture Division, Department of Agriculture, Wellington. These brief notes have been compiled so that the reply "The specimen was so wilted and bruised or decayed on arrival that examination failed to reveal the cause of the trouble described" might be avoided.

Diseased Specimens.—When information in respect of disease or pests is required, a description only of the condition of the plant is insufficient. It should be accompanied by a specimen of the affected plant, packed carefully as described below. The description should include:—

(1) Variety of crop and the previous crop grown on the same soil; also, whether grown under glass or outside.

(2) Type of soil and the manurial treatment given.

(3) Nature and appearance of the infection, the stage of development of the plant when the condition was first noticed, the severity of the attack, the extent of the infection, and whether or not the disease or pest has been noticed in previous years.

These details are essential when methods of control are to be indicated, for, while the troubles can generally be identified, there is frequently some point of management which is at fault and which, if rectified, will be of material assistance in controlling the disease or pest.

Selection and Packing of Infected Specimens.

(1) Succulent Specimens.—Select specimens representative of the diseased condition and showing as many of the diseased parts as possible. In most instances they should contain root, stem, leaf, and flowers (or fruit). The most suitable are whole plants with the soil carefully removed from the roots. Pack the specimens promptly after taking them up, and forward them without any delay by the first mail. They should be posted early in the week so that they may arrive without spending the week-end or a holiday period in the post.

Pack the specimens in such a way that they are firm and do not move within the parcel, and so that they retain their moisture. It is generally sufficient if the moisture within the specimen can be maintained at its original level. To obtain this, the specimen may be packed carefully in damp moss, paper or cloth, and surrounded by grease-proof paper. A suitable condition of this packing material occurs when it is thoroughly wetted and tightly squeezed so that the surplus moisture is driven out. Thereafter, any spaces in the parcel should be filled with dry packing material. A wooden or cardboard box is the most suitable container. If a tin is used damp packing material will not be required.

(2) Fruit Specimens.—Where the fruit shows disease, it is sufficient to pack the specimens firmly in a wooden or cardboard box.

(3) Woody Specimens.—These, if dry, may be forwarded in that condition: but any succulence in the wood or bark should be retained. Ample wrapping paper will generally do this satisfactorily.

(4) Bulb and Tuber Specimens.—Where disease occurs on the bulbs or tubers, those which show evidence of the diseased condition should not be trimmed of any outer coverings when forwarded. They should be packed firmly in a box so that they arrive undamaged.

(5) Soil Specimens.—A sample of soil weighing about ½lb. should be forwarded. This may be most suitably packed in a tin.

Insect Specimens.—Live insects should be forwarded in a tin or box. Some leafy or stemmy material, preferably that on which they were found, should be included in the container, and can generally be packed loose but firm enough not to move in the parcel. The larvae of insects must be forwarded in or on the medium in which they were found. These should arrive in living condition, as frequently they have to be reared to enable them to be identified from the adult insect.

A well-packed specimen received for identification. The photograph was taken 23 days after the parcel had been posted, and even then the plant was in perfectly fresh condition. Grease-proof paper, damp (but not wet) cloth, and corrugated cardboard were used in packing.

[H. Drake, photo

Plant Specimens for Identification.—The specimen, if small, should consist of root, stem, leaf, and flower (or fruit). With larger specimens it is especially important that the leaf and flower (or fruit) should be included in the sample. It is an advantage if the specimen can arrive in fresh condition, but this is not as important as it is with diseased specimens. Botanical specimens may be forwarded between sheets of absorbent paper, and in a dry, or semi-dry, condition are quite satisfactory for examination so long as they are not unduly crushed. A piece of cardboard of suitable size enclosed in the parcel will prevent this.

Specimen Fruits for Identification.—These should be enclosed in a rigid box. They should consist of two or three ripe, typical specimens of average size, with stalks attached, and including some foliage. The covering letter should contain a description of the conditions under which they were grown.

APIARY NOTES

Contributed by Officers of the Horticulture Division

The Crystallisation of Honey

BECAUSE of the installation of a honey-packing plant capable of dealing with any type of honey (whether coarse or fine grained) during the course of packing into retail containers, the state of granulation is not taken into consideration when grading honey supplied to the Internal Marketing Division. It is necessary, however, for bee-keepers who do not supply the central packing organisation to market their honey in a properly granulated form.

Every package of poorly-packed, coarse-grained honey is a bad advertisement for the industry, and does not increase the consumers' desire to eat more honey.

Unlike the products of human manufacture, honey is not a rigidly standardised commodity, but varies greatly according to the floral nectars from which it is derived. There are few types of honey in New Zealand that will granulate in summer time with a smooth grain. Honeys are also of variable composition, depending upon the flowers from which the chief supply of nectar is gathered. In addition to this, the water-content of any given honey varies with the rapidity of the honey flow and atmospheric conditions during the period of collecting and storage by the bees.

The variation in sugars and water-content largely accounts for the variation in granulation between different honeys. Honey has a definite tendency to segregate into liquid and crystallise layers because of its composition of sugars which vary in weight and volume; especially is this so when granulation is retarded either by warm temperatures or high moisture-content.

Chemical Constituents

The average chemical constituents of New Zealand honeys, as published by the Cawthron Institute, are as follows:—

Water, 17.5 per cent.
Dextrose, 36.2 per cent.
Levulose, 40.0 per cent.
Sucrose, 2.8 per cent.

To obtain an even, smooth grain the whole must be thoroughly mixed, and granulation must be rapid to overcome any partial separation of the above constituents.

Assist Granulation

To assist granulation it is necessary to add a starter of smooth-grained honey at the time of mixing, and to secure rapid granulation low temperatures are necessary.

In some southern districts and parts of the North Island a dry atmosphere during the honey flow period, coupled with cool nights as the season progresses, provides ideal conditions for quick granulation; consequently it is not necessary for bee-keepers to do more than clarify their honey, add a little starter, carefully mix well, and pack immediately. Other districts, however, are not so fortunate. Warm days and nights with a moisture-laden atmosphere during the gathering, extracting, and storage periods retard granulation and prevent honey from granulating naturally with a firm, smooth grain.

Any class of New Zealand honey, with the exception of manuka, will respond readily to treatment either at the time of extraction from the combs or months later, when the honey may be granulated in a coarse-grained, uneven condition.

Although effective methods to recondition coarse-grained honey have been practised in New Zealand for many years, Dr. Dyce, of Canada, determined by his experiments the temperatures to which honey can be safely raised, and also the temperature at which granulation is most rapid.

The Dyce Method

The following is a brief outline of the Dyce method which is used in Canada, but slightly modified here in New Zealand:—

"Since all honeys are assumed to contain yeasts, it is advisable to heat all honeys. This destroys the yeasts and liquifies any coarse crystals which may be present. The honey should then be cooled as quickly as possible.

"At a temperature of about 75 degrees Fahrenheit the starter of smooth-grained honey is added. It is necessary only that the temperature be so lowered that the small crystals will not be liquified. At this temperature the consistency of the honey is such that a thorough mixing of the starter with the liquid honey is easily accomplished.

"If the honey is of high consistency, it is desirable to introduce the portion of finely-granulated honey at slightly higher temperatures, while for thin honeys a temperature slightly lower than 75 degrees Fahrenheit is more favourable.

"In general, the larger the proportion of starter used the more speedy is further crystal formation. For practical purposes from 5 to 10 per cent. of added starter is best. It is desirable that there be a thorough mixing of the two portions so that the minute crystals may become thoroughly distributed in all portions of the liquid honey. When this is completed it is desirable to run the honey immediately into the final containers.

"The honey is then placed in a cool chamber at between 55 and 60 degrees Fahrenheit. For light-bodied honeys incline to the lowest temperature. Where correct temperatures and other factors are observed processed honey should reach the solid stage of crystallisation in from two to four days.

(*Continued on page 128.*)

Notes for the Poultry Farmer

Contributed by Officers of the Livestock Division

Culling and Selection of Stock

FROM now on, the main job of culling the stock and selecting the breeders for next season's pens takes place. It is, of course, a busy time of the year for all poultrymen, but it must be remembered that the whole future of the farm depends upon sound culling and the selection only of the best available breeding stock.

What Poultry Breeding Means

"Poultry breeding refers to the reproduction and inherent improvement of domestic birds. It not only involves the replacing of older individuals with younger ones, but it implies exchanging of the poor, or even the good, for the inherently better. Mere maintenance or increase of numbers can be reduced to a problem of poultry management; but continued progress, through successive generations, towards a desired objective in the way of quality or performance, calls into play all the skill of which a poultryman is capable in applying the science of genetics to the selection and improvement of his flock." ("Poultry Production," by William Adams Lippincott.)

According to the foregoing it can be plainly seen that the art (and it is an art) of poultry breeding must involve a continual upward and forward movement. To maintain a high-class flock—that is, not only with regard to laying but also to breed points—a poultryman must, of necessity, have an ideal type in his mind's eye, because if there is no ideal in view, the whole thing will revert to mere reproduction without the improvement which is so desirable.

It is for this purpose that the services of the Department's Poultry Instructors are available to anyone who desires to improve his stock and who does not consider his knowledge and experience are sufficient to enable him to do this on his own.

Culling

Culling should not be left to one particular time of the year, but should be continual, starting from the incubator and continuing throughout the life of the birds. However, the main period of culling adult stock is during February and March, and at this time of the year the whole flock should be examined and all birds which it is considered will not be profitable to keep for the following year should be removed and sold.

The continual elimination throughout the year of those birds which are not producing must reduce the cost of feeding for the flock, and it is only by watching these feed costs in conjunction with the egg production that a success can be made of poultry farming.

It can be readily understood that there must be a heavy drain on the stamina and bodily resources of all birds which have been laying continuously for 10 to 12 months. This drain will begin to tell on the weaker specimens earlier than on the stronger birds, and this is why the early moulter is always culled.

All birds of 2½ years and over should be disposed of as soon as they stop laying, provided they are unsuitable to keep for breeding for the following season. As a general rule, all birds which begin to moult before the end of February should be culled, but this rule cannot, of course, be strictly adhered to in all cases. It may be that the birds have been mismanaged in some way or the moult has been forced through some other factor, in which case due allowance must be made.

Any bird which has a small, shrivelled, or dried-up comb, and possibly a yellow beak and legs, is definitely not laying and should be culled; in fact, any bird which is not looking shabby and dirty and dry in appearance should be caught and examined to see if it is laying or not. Clean feathers on a bird at this time of the year are a fairly good indication that she has not been laying well.

Many people have been worried at this time of the year by one of the birds losing the feathers from the back of the head, leaving the skin quite red like a good-coloured comb. This, however, is merely an indication of a good layer, and this sign should be of value to a poultryman when he is considering his birds during the culling operations.

Every poultryman should learn all he can of the art of culling, because it is only by the continual elimination of the non-producer that he will obtain the best return for his labours. It is easy to pick the obvious culls from a flock, but it is only by practice and experience that the art of weighing up a bird's good and bad points can be mastered.

Selection of Breeding Stock

The selection of breeding stock should be undertaken at the same time as the culling, because it is only from what are termed "late moulters" that the breeders should be selected. If this selection is left until all the birds have moulted it is naturally impossible to pick these late moulters.

It will be found that the culling and selection of the birds will result very much as follows:—One-third culls, one-third layers, and one-third breeders. This is, of course, an average; in a few cases the percentage of breeders may be higher, but on the average farm there are not more than approximately one-third which should be included in the breeding pen. It is regrettable, however, that the standard by which many poultrymen pick their breeders is either so low or so elastic that many undesirable birds are included.

There are many points to consider in the selection of hens which will be suitable for breeders the following

season. The first and most important is body-size. If a bird has not sufficient size she should not be considered, regardless of what she is like in other points. Once the selector is satisfied with the size, then the other points, such as good comb, strong beak, bold, bright eye, good body carriage, prominent crop, deep abdomen, and in general all those points which go to make up good type, can be weighed up.

In considering a bird, the laying ability must not be forgotten; a good layer is active, more alert, and yet at the same time more easily handled than the poor layer. She is among the first off the perch in the morning and among the last on it at night. When not on the nest she is busy and business-like, scratching or ranging in an eager search for feed. The appetite of a great layer is seldom satisfied. It is these small points which all go to make up the ideal breeder.

A further point for consideration is the age of the breeding stock. Except in the hands of the experienced breeder, pullets should not be included in the breeding pen. Opinions differ on the question of the age to which hens may be retained for breeding purposes. Longevity, or liveability, is an important factor, but in general practice it is not advisable to retain hens over four years of age. After this age the marked decrease in eggs produced during the breeding season makes such birds uneconomical, while the number of progeny obtained is further reduced by the lowered hatchability of eggs from these older birds. Some experienced breeders go as far as to claim that the progeny from really old breeding stock lack satisfactory stamina. As a guide, it is suggested that only birds of exceptional merit should be retained for more than two breeding seasons.

When selecting breeding stock, just as much attention must be paid to the male birds as the females. Many poultrymen select their hens well, but neglect the males by not being quite so particular. It would probably make a big difference if each poultryman realised the influence of the male bird on the progeny.

When a breeding pen is made up it should be done with the knowledge that the laying ability of the pullet progeny will be affected by the male bird in the breeding pen, not the hens. The hens' laying ability will be passed on to the cockerels reared from the mating, and then passed on to the pullets' chicks the following season through these cockerels. Thus it will be seen that pullets of high-laying power cannot be expected from a pen of good laying hens if the cockerel or cock bird is from a poor laying strain.

Rearing Cockerels

The necessity of the good rearing of cockerels cannot be sufficient emphasised if the chicks and resultant stock from the following season's matings are to come up to expectations. Many people look after their pullets well, giving good food, good attention, and possibly free range, and yet neglect the cockerels.

Where the breeding hens have been reared well it is reasonable to assume that the resultant progeny will be good, but in many cases this assumption has not been realised simply because the cockerels have been overcrowded and reared in a house with a small run and with perhaps insufficient food. Any expectations of good results from cockerels reared under such conditions are foredoomed to failure. The poultryman must realise that the male bird is half the breeding pen.

Answers to Correspondents

Growth of Young Pullets

A.J.H. (SOUTHLAND):—

I should like some advice about our young pullets. They are now 12 weeks old, and have developed and feathered excellently. Some are showing red in the comb. We were wondering if they are developing too fast. They have been fed with the best of grains and mash and greens, and have a big run where mixed grasses and oats are growing. We do not want them to start laying until they are strong enough to stand the strain. We have weighed several of them, and they vary from 2 lbs. to 2½ lbs.

Their dry mash consists of pollard, bran, maize, meal, oat-meal, oyster shell meal, bone-flour, buttermilk powder, and codliver oil, and they have had milk made from the powder before them since they were hatched. Their grain is hulled oats and wheat mixed.

I shall be glad if you could advise me through the pages of your "Journal" if we should cut down anything if they are developing too fast.

POULTRY INSTRUCTOR:—

Your pullets appear to have done well as regards growth. It is to be regretted that you omitted to state the quantities of the ingredients in your mash, and because of this omission it is impossible to say whether or not you have been forcing them too much. However, your best plan would be to eliminate the meat-meal completely, and also to give more grain to eat and close up the dry mash hoppers except between the hours of 10 and 2 o'clock. This reduction in dry mash should not stunt their growth provided the pullets are given sufficient grain to satisfy them.

Selection of Ducks

"PUCK" (Featherston):—

As I want to run some ducks on this property I would be glad if you could advise me as to the best breed. Egg production, of course, is of great importance, but the birds must also be a good table bird. The conditions here are apt to be severe—heavy winds, and cold weather in the winter, and sudden changes from warm to cold. Ample running water is available, and swampy ground, but good dry quarters can be provided at night. Thanking you for a reply in the "Journal."

POULTRY INSTRUCTOR:—

While your local conditions do not appear the best, I am of the opinion that the Khaki Campbell breed of ducks would be most suitable for your requirements. This particular breed is one of the heavier varieties, and is regarded as a dual-purpose bird. Besides being suitable for table purposes, they are prolific layers, and generally do well in any locality.

APIARY NOTES—Continued from page 126.

after which the honey may be removed from the cool chamber and placed in ordinary storage."

High Temperatures

In countries where honey is sold in liquid form, notably America, it is necessary to heat the honey up to 160 degrees Fahrenheit, and to seal it while hot. At this high temperature granulation is arrested and all yeasts destroyed. Where all precautions are taken to prevent contamination and only capped honey is removed from the hives, it is not desirable to heat New Zealand honey above temperatures necessary to make it thoroughly liquid, as the bulk of our honey is marketed in granulated form. High temperatures darken the honey and destroy its natural brightness, and the flavour may also be seriously impaired.

Honey intended for delivery to the Internal Marketing Division in New Zealand should not be processed in any way by the bee-keeper while the present grading and packing arrangements continue. The honey should be packed free from froth, air bubbles, and all impurities.

—T. S. WINTER, Senior Apiary Instructor, Wellington.

N.Z. Federation of Young Farmers' Clubs

Edited by S. Freeman, Dominion Organizing Secretary

South Island Y.F.C. Scholarships To Lincoln College

By S. R. WHYTE, Hon. Secretary, Otago-Southland Y.F.C. Council.

THE Young Farmers' Club Scholarship Committee, consisting of Messrs. A. C. Cameron (convener), W. R. Harris (chairman, Otago and Southland Council), H. G. Stevens (chairman, Canterbury Council), R. McGillivray (Fields Superintendent for Canterbury), J. W. Woodcock (Fields Superintendent for Otago), has announced the following Scholarship Awards tenable at Lincoln College for 1941.

The Lincoln College Old Students' Scholarship awarded to a member of the N.Z. Federation of Young Farmers' Clubs with outstanding qualifications:

JAMES LAWRENCE FALCONER, son of Lt. Col. (temporary Colonel) A. S. Falconer, D.S.O., M.C. in command of the Fifth Brigade N.Z.E.F. Overseas.

The Canterbury Frozen Meat Company's Scholarship available to a Canterbury member of the N.Z. Federation of Young Farmers' Clubs of outstanding merit:—

JOHN H. OLDFIELD, son of Mr. F. G. Oldfield, of Winchmore, R.D. Ashburton, and a well-known sheep farmer of Mid-Canterbury.

The committee reports that although the number of applications was few, the standard was exceptionally high.

James Lawrence Falconer was born in Dunedin in 1921, and received his education at the Leith Valley, George Street, and Otago Boys' High Schools. His desire to be a farmer was evidenced very early, and he took every opportunity of spending his holidays in the country. When he left High School Falconer became a cadet on Messrs. Hugh Mackenzie and Sons' Walter Peak and Mt. Nicholas Stations, the owners of which reluctantly released him when he decided to acquire a knowledge of agricultural farming. He spent some 18 months with Mr. C. J. Aitchison, of Pateroa, doing the team work as well as a certain amount of sheep work. In November of this year, when only 19 years of age, he returned to Walter Peak to act as head shepherd, and is at present in that position. When it is remembered that this station and Mt. Nicholas, which are worked in conjunction with each other, muster in the vicinity of 33,000 sheep, it will be seen that his employers recognise in Falconer outstanding ability and judgment. Nor has it been only in farming that he has shown an interest, as he has been keen on sport while at school, and has taken a lively interest in the Young Farmers' Club movement, although this has necessarily been restricted by the fact that his work has kept him isolated from the centres where clubs are functioning.

John H. Oldfield is the descendant of an old sheep farming family in Canterbury, and at 18 years of age shows ability as a judge of stock considered by those competent to judge as being well above the average. He received his secondary education at the Methven District High School and, although like Falconer, he has not been able to take a direct interest in club work, he has achieved considerable success in stock judging and other competitions at field days, organised by the movement. Oldfield will also take the Diploma Course at Lincoln College, and there is no doubt that the period spent there will be used by him to the utmost advantage.

Activities of Young Farmers' Clubs In Scotland

The following, extracted from "The Scottish Farmer," is reprinted in this section, as it is of particular interest to our own organisation.—Ed.

THAT the war has hit the Young Farmers' Club movement fairly hard cannot be denied. At least to carry on a club on pre-war lines is difficult. Fortunately, however, the enthusiasm of most club members has not diminished. A recent query to clubs brought the reply in some cases that it was almost necessary to curb the members' enthusiasm—surely a healthy and desirable state of affairs.

The outbreak of war brought a sudden check to important developments in the movement. Although only a little over a year old, the Scottish Association of Young Farmers' Clubs had, through its organising secretary,

Mr. Chambers, been laying a foundation on which new and vigorous activities, as well as an expansion in both numbers of clubs and members, could be developed. These plans have had to be put aside until such times as we can function once again on an inter-club and inter-district basis. At present, clubs can operate only as individual units.

In considering suitable programmes for the coming winter, the experiences of last winter are useful. During September and October of 1939 the general atmosphere of uncertainty made it difficult for club leaders and officials to arrange activities. Further, the departure of those members who had been Territorials, the difficulty of getting suitably "blacked-out" premises, the shortage of petrol, and so on, all made meetings far from easy to arrange. Some clubs actually decided to close down, but most of them subsequently reversed this decision, and, as the winter developed, gradually resumed activity, though on a definitely limited basis.

This year the situation is much clearer. Although many members are now occupied with the Home Guard, they have some time available for club work. Clubs can also plan ahead in the light of their experiences of last winter. Further, we have the decided advantage of a clarified war situation. Although this year has brought the war much nearer to us and the situation has become extremely grave, it has at the same time converted us into a determined and united nation, infinitely more capable of decisive action on both the fighting and the domestic fronts. Certainly, clubs are in much better spirits for an active winter's work today than they were a year ago.

Changes Made Last Year

One of the interesting developments last winter was the change in the nature of many club meetings. All clubs were thrown back on their own resources and were compelled to be much more self-contained and original. In many ways this was a real advantage. Too many clubs had far too long run their winter meetings as a mere series of lectures by visiting lecturers. But the purpose of a club is not merely to give the members the views of outsiders and a series of hints on up-to-date farming; it is also to ascertain the views and ideas of its own members and to train and develop their ability to reason, to argue, and to express their own point of veiw.

It would appear that since the war began about two-thirds of the club meetings have been conducted by the members themselves, without any outside speaker, and once the members have become accustomed to doing this, and have acquired the confidence to do it, they find such meetings more interesting and more stimulating than a mere series of lectures. What is wanted is a judicious blending of lectures by outsiders with meetings in which the members themselves provide either the material for discussion or some other activity.

The difficulty of obtaining "blacked-out" premises for meetings is not now likely to arise, unless in very exceptional circumstances. Most districts have now some room suitably prepared, but where the regular meeting place of any club has not already been put right there is nothing to prevent a club, either alone, or in co-operation with another organisation using the same premises, from taking steps to "black-out" a room sufficiently large for the purpose. Any club, if it is healthy and virile, more especially if there are girl members, as there ought to be in every club, could easily make this its first activity for this winter.

Broader Activities

War experience provides us with the opportunity of developing club activities along broader and more beneficial lines. It has always been too narrow a conception of the movement's objects to look on a club merely as a means of arranging a few visits to judge livestock in summer, with a few lectures on farming and an odd dance in winter. We should strive not only to

CAN YOU ANSWER THESE QUESTIONS?

A How does the question of "natural increase" of live stock arise in connection with stock securities?

B Is a Mortgagee liable for Local Body Rates?

C What are the arguments for and against a standard valuation of live stock for the purposes of keeping accounts?

WHO WILL BE THE SUCCESSFUL FARMERS OF TO-MORROW ?

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Practical experience and hard work were enough to bring success to most farmers.

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make club members more efficient at whatever farm job they do, but also to provide activities that will make living in rural areas still more attractive and beneficial, as well as to help members to realise both the advantages of playing their full part as citizens and the necessity of doing their duty in this connection.

During this coming winter we shall have stationed in rural centres a large number of men on active service, members of the women's services, of the Women's Land Army, etc., many of whom will have no extensive, if any, knowledge of the countryside and few, if any, friends where they are billeted. A nation under arms waiting for attack cannot afford to let any of these individuals, on whom so much is to depend, be bored during the hours when they are not on active duty.

The Social Side

Social amenities, healthy recreation, and educational activities are vitally necessary, and while the services themselves take some steps in this direction, and there are also many other voluntary organisations already doing work of this character, there is still ample scope for Young Farmers' Clubs to come in and do their share. Agriculture in this war is playing its part as a food production service, and, because of the importance of this, its members are reserved from military service.

Because of this we should be all the more ready to show our appreciation of those whose duty it is to defend us under conditions of extreme danger. This we can best do by making any spells spent by them in the countryside as pleasant and as beneficial as possible. Some of the people concerned may have agricultural connections, others may even be members of Young Farmers' Clubs, who will welcome the opportunity of meeting fellow-members and of seeing something of farming in a new area.

Discussion Groups

Another interesting feature which appeared last winter was the discussion group, a most successful example of which was run in Dumfriesshire. There are some clubs which draw their members from a very wide radius, with the result that those living farthest afield may have difficulty, under war conditions, in travelling to meetings. The discussion group provides a means of keeping all the members interested and in touch with club work. A group of members, however small, living near each other can meet by arrangement in the house of one of the members and have discussions on agreed topics.

There could be several such groups in the one club. They will function best if they can have one person present who is rather older than the rest, preferably a former club member, who may have passed the age limit, though this is not absolutely essential. He or she can be a sort of group leader. It is possible in these small groups to get all the members present taking a more active part, and also to get a more thorough and more exhaustive discussion of a point than is usually possible in a bigger meeting.

Suitable Topics

There is at present no lack of suitable topics for such groups to consider. The whole range of increased food production, and the effects of war on farming organisation and on rural life could keep any group arguing for many meetings. In fact, it is a duty of all Young Farmers in their capacity of prospective "Farmers of Tomorrow" to consider how best agriculture can be made to adapt itself to our new conditions. The good old days, if such they were, of pre-1914, as well as the ups and downs of the last twenty years, have gone.

Just as the social and economic life of the whole nation cannot avoid serious changes resulting from this conflict, so agriculture, a part of the nation, is likely also to experience marked changes. Young Farmers could profitably consider what developments they deem necessary and desirable to make farming a really efficient food production organisation for the nation.

These few suggestions in regard to activities are possibly more appropriate for the older members, the "over 18's." They also are likely to be more interested in helping, as so many clubs are now doing, and rightly so, with efforts to assist the Red Cross Agriculture Fund, the collection of scrap metal, and so on.

Younger Members

But there is quite a definite need for some effective steps by clubs to attract still younger members, especially those between school leaving age and eighteen. What suits the older members is not, however, so well adapted for those of younger years, a point we are all too often apt to forget. Interest is very soon lost if in every activity chief place is taken by those five to ten years older. Even the youngest likes some little slice of honour and responsibility. Not only will cubs soon find themseves in difficuties if they fail to recruit and hold new and younger members, but they will also be neglecting to do something urgent for those who are at an age when their whole attitude to rural affairs is moulded and determined.

Darfield Club's Patriotic Work

By R. M. FECHNEY, Hon. Secretary, Darfield Club.

THE following is a report on recent patriotic activities of the Darfield Young Farmers' Club.

On August 7 the sum of £25 was lent to the Government, interest free, for the duration of the war and six months thereafter. The annual ball on September 19 proved to be the most successful yet held by the club, more than 400 guests being present, and from the profits the sum of £12 12s. was donated to the local branch of the Red Cross Society. At this ball the Advisory President (Mr. C. O. Redfern) presented the two cups competed for during the year—Mr. R. S. Gunn's cup for most points gained in all club stock-judging competitions, won by J. D. Gallagher; and the club's cup for the stacking competition, won by W. M. Wilson. Miniature cups for last year's winners were presented to R. K. Reed and W. M. Wilson.

A barn dance was held on November 7, and the proceeds, amounting to £9 3s., are to be devoted to the Country Queen (Mrs. Leonard Coop) at the forthcoming Patriotic Carnival. The Advisory President (Mr. C. O. Redfern) kindly put his granary at the club's disposal for the occasion.

A number of club members have enlisted, and so far five have gone overseas. These members have each received a useful gift to the value of approximately fifteen shillings.

Taking into account last year's donation of £11 14s. to the Red Cross, the Darfield Y.F.C. has already spent approximately £58 10s. on Patriotic and war purposes since the outbreak of war.

Shearing Field Days

FOLLOWING suggestions made at the last meeting of the Horowhenua District Committee, field days were held by the Levin and Johnsonville Clubs in order to give members an opportunity to learn the first essentials of shearing. These were both successful from the point of view of the interest shown by Club members, and much of value was learnt.

There was an attendance of 26 club members at Mr. R. Law's shearing shed on Friday, November 15. Individual tuition was given to all members attending by Messrs. R. Law, sen., R. Law, jun., and K. Moodie.

Operations started at 10 a.m. and continued until 3.30 p.m., with a break for lunch. All members were given the opportunity of shearing at least one sheep, and remarkable progress was made by those who tackled more than one.

No competition was held between members, as this will be more valuable later on when more practice has been obtained. However, demonstrations were given by the instructors, and Mr. R. J. Law also gave a demonstration on throwing and rolling a fleece.

Members of the club were very appreciative of the assistance given by Messrs. Law sen. and jun. in providing their shed and sheep, without which a most useful and instructive day would not have been possible.

—*G. S. ROBINSON,*
District Secretary.

A group of Young Farmers at the Levin Club's shearing field day.

Johnsonville Shearing Field Day.

A VERY enjoyable and instructive day was spent by the Johnsonville Y.F.C. on November 16 at a shearing contest in Messrs. Bryant Bros.' shed, Ohariu Valley. About 60 persons were present, including ladies, and 12 shearers entered for the competition. Mr. R. Macfarlane kindly acted as judge, and also gave sound advice to the young shearers.

Mr. N. Bryant was placed first, with Mr. H. Brown second, and fastest time for three sheep went to Mr. W. Bryant, time 10 min. 20 sec. Mr. Black, of Levin and Co., gave some tips on skirting and rolling the fleece, and during the afternoon tea, which concluded the day, the chairman thanked the various persons responsible for making the day a success and Messrs. Bryant Bros. for the use of their shed.

—*R. ROWELL, Hon. Sec.,*
Johnsonville Club.

Among the Clubs: Reports on Activities

At this time of the year there is normally a shortage of news from the clubs through many of them having gone into recess because of seasonal farm activities. This applies particularly to the South Island, where harvesting and other operations make it necessary for clubs to close down during the summer months; the same applies in a lesser degree to clubs in the North Island, many of which close down for one to two months for haymaking, shearing, etc. At the present time, in addition to the foregoing, a number of clubs have found it necessary to go into temporary recess because of so many members being absent in Territorial camps, which, combined with the number of members already serving in the overseas forces, has in many cases seriously depleted active membership.—Editor.

Western Southland.

Wyndham.—Members selected to act as stewards at Wyndham A. and P. Show. An address was given by Mr. W. L. Stewart on "The Art of Speaking in Public."

Dunedin.

South Taieri.—Talk given by Mr. Colin How, Consulting Officer, N.Z. Dairy Board, on "Increased Production, Sire Recording and Nutrition and its Relation to Disease." This was followed by a demonstration by Mr. Passmore, of the Europa Oil Co., in which the lubricating qualities of different oils were shown. Numerous questions were answered by both speakers, and a very instructive evening was spent.

South Canterbury.

Cannington-Cave.—Field day held on Mr. Baker's farm, Motukika. Mr. Baker gave an address on "Fat Lamb Breeding and General Farming Practice"; Mr. R. McKenzie also spoke. At the last meeting it was decided to cease club operations for three months. The treasurer reported that the club had raised £16 for Red Cross and Patriotic Funds. Lecturers were Mr. J. Crawford ("The Levels Station in the days of the New Zealand and Australian Land Co.") and Mr. J. McKerchan ("Border Leicester Sheep").

Milford.—A field day was held on Mr. J. C. Bisdee's property, members being shown over by Mr. R. Bisdee; the farm is situated at Clandeboye, and consists in the main of very heavy land. Mr. R. Dale, on behalf of those present, thanked Mr. Bisdee for his interest and the valuable information he had given. The final club meeting for the season was held in the evening, and was run on the lines of a social; items were contributed and a toast list was honoured, members being given the opportunity either to propose or reply to toasts. At the previous meeting arrangements were made for members to visit the P.W.D. camp at Temuka.

Mid-Canterbury.

Hinds.—Final meeting for the year held as a social evening. Items were given by Messrs. E. Rhodes and W. Keeley. Mr. E. Withey completed a pleasant evening by exhibiting motion pictures of his recent tour of the North Island.

Methven.—Team selected to represent the club in the stock judging competition at the Ashburton A. and P. Show. Advice was received from the Methven A. and P. Association that it would allow Y.F.C. members to enter for junior judges' certificates at the next show; the names of members intending to make application were forwarded to the association. Mr. R. E. Todhunter, "Blackford," Rakaia Gorge, spoke on "The Importance of Farming as an Industry in New Zealand Today," and also on "Wool-scouring" and "Hill-country Farming."

Christchurch.

Ellesmere.—Exhibition of motion films by Messrs. W. Mawhinney and Turnbull, of Massey Harris Co., depicting scenic, mining, and machinery topics.

North Canterbury.

Cheviot.—Discussion on suitable places in public reserves, etc., for planting of Centennial memorial trees. Decided to approach Cheviot A. and P. Association to schedule classes in sheep section for competition among Y.F.C. members. Address by Mr. A. Flay, of Lincoln College, on "Farm Management."

Wairarapa.

Carterton.—Discussion on altering date of meeting to avoid clashing with Home Guard parade. Address by Mr. G. E. Allen on "Dips and Dipping."

Martinborough.—Lecture by Mr. P. Amas on "Breaking in Horses."

Manawatu.

Bunnythorpe.—Lecture and demonstration on a Southdown ram by Alan Stewart, a club member.

Oroua Downs.—Annual meeting held in January because of members going into Territorial camps. Officers elected:—Advisory president, Mr. R. Craig; chairman, S. D. Bryden; secretary and treasurer, J. L. Marsden. At the previous meeting Mr. R. Craig gave a talk and demonstration on "How to Run a Meeting on Strictly Correct Lines."

Pohangina Valley.—Annual meeting. Officers elected:—Chairman, T. A. Turnbull; secretary, R. Balmer; treasurer, V. Sinclair. At the previous meeting Mr. Lewis Gold, of Palmerston North, gave a talk on "Impressions and Facts Concerning the Union of South Africa."

Rongotea.—Decided to hold annual meeting early in March. Miniature Cup to be again donated this year for Calf Club Championship. Report on shearing field day held on December 3 in which about 20 members participated. Talk by Mr. Lewis Gold, of Palmerston North, on "Impressions and Facts Concerning the Union of South Africa."

Tokomaru.—Decided to go into recess for two months. Several members attended a meeting of the Opiki Club, addressed by the Dominion Organising Secretary.

South Taranaki.

Alton.—Talk by E. Muggeridge, a club member, on "Pasture Management." Mr. Muggeridge, who is attending Massey College, was congratulated by the meeting on having obtained top marks at the college.

Eltham.—Address by Mr. J. E. Davies, Department of Agriculture (District Y.F.C. Secretary), on "How Young Farmers Can Help in the War Effort."

Central Hawke's Bay.

Onga Onga.—Messrs. E. S. Bibby and C. Masters gave two interesting talks on the early history of the local district, dealing with the various big holdings, and how and when they were cut up for close settlement.

Takapau.—Programme of sound films exhibited by Mr. J. W. Palmer, Department of Agriculture (District Y.F.C. Secretary).

Poverty Bay.

Te Karaka.—Impromptu speeches by club members.

Northern Hawke's Bay.

Meeanee.—Mr. J. Parsons to be asked to act as club's representative on the Taradale Home Guard Committee. Mr. Wilding and Mr. Currie were the guests of the club; Mr. Wilding gave a talk on the reasons why farmers should sow only the best of seeds, more especially when sowing ryegrass and/or clovers. The speaker spent considerable time in explanation and answering questions.

Wairoa.—Address by Mr. W. M. Hood, manager of the Union Bank of Australia, Wairoa, on "The Banking System and International Exchange." Report submitted on the club's scheme to place secondary school boys on farms during holiday periods; it transpired that, good as the scheme is, there had not been sufficient support to launch it successfully.

Waikato.

Hauraki.—Business meeting; general discussion on club activities, etc.

Te Awamutu.—Decided to go into recess for the duration of the Mounted Rifles camp because of a large number of the club members attending the camp. A club debate was held, the subject being "That the Scientist has been Detrimental to Mankind"; the Rev. Martin Sullivan acted as adjudicator, and gave the award to the affirmative team. At previously unreported meetings the club was addressed by Mr. Corby (representing the N.Z. Dairy Board) on "The Feeding of Stock During the Winter" and short talks were given by the following club members: Ian Donaldson, Bob Mander, Linc Lager, and Alex Laskey. A field day was held on Mr. J. S. Pattison's farm, Kihi Kihi, with an attendance of 40 club members and five visitors; Mr. Pattison demonstrated the points of a dairy cow, and stock judging competitions were held, being won by J. McKinnon, M. Lorimer, and E. Fitzpatrick.

Eastern Bay of Plenty.

Waimana.—Arrangements for a dance. R. Woolfield (club member) selected to write up a history of the district.

Western Bay of Plenty.

Kati Kati.—Business meeting. Letter of thanks to be forwarded to club members serving overseas for their thoughtful Christmas greetings. Arrangements made for future meetings.

Te Puke.—Lecture by Mr. A. Gordon, "Bacteria on the Farm."

Waihi High School Club.—Mr. A. V. Allo, Department of Agriculture, addressed the meeting on "Weeds," and identified specimens brought by members from their farms and gardens. A field day was held on Mr. Capamagian's farm, Athenree; Mr. Capamagian demonstrated the shearing of sheep, the skirting and rolling of the fleece, and the baling of the wool. Members also studied the lay-out of the shearing shed and yards.

Workworth.

Kaukapakapa.—Decided to take an active part in the local show of the Helensville A. and P. Association. At a club field day Mr. H. W. Carbury, M.R.C.V.S., Government Veterinarian, demonstrated on the carcass of a dairy cow, and gave a talk on "Diseases of Dairy Stock and their Treatment."

EXCLUSIVE TO THE 29 H.B. MEN'S STORES.

Hallensteins

29 MEN'S STORES: From Whangarei in the North to Invercargill in the South.

Health Notes for the Farm

Contributed by the Department of Health

Keep Cool During The Hot Weather

THE temperature of the air has a very important bearing on health, although man has an almost incredible power of adapting himself to wide variations of temperature. The reason why man is able to maintain a constant body temperature when exposed to great variations of atmospheric temperature is due not only to the body mechanism which regulates heat production and elimination, but to the layers of air immediately in contact with the skin.

We wear clothes to protect ourselves from external heat or cold, but still more do we wear air for that purpose. That is why warm temperatures are better borne when the air is in motion, which facilitates evaporation, than when the air is still, while extremes of cold are better borne when the air is still, for then we become clothed in a blanket of air.

The effect of heat upon health, however, cannot be considered alone, for it depends on the humidity as well as on the movement of the air. Extremes of heat and cold are much more trying when the air is humid than when the air is dry. The withering effects of heat upon infants and adults, too, are increased by the still, moist air found in overcrowded narrow streets and poor ventilation of houses. Excessive moisture makes hot air feel hotter and cold air colder.

Construction Of Buildings

Now that summer is here some suggestions might be considered for comfort and health during hot months. In the construction of buildings, often too little thought is given to making them comfortable for human occupancy during extremes of outside temperatures. Much can be accomplished by proper and expert planning of buildings so as to exclude extreme cold and afford the maximum amount of ventilation in summer. In the tropics, where the problem of heat is vital, there are two fundamental principles upon which house building depends—first, the attainment of the greatest amount of ventilation and air circulation, and secondly, the exclusion of the greatest possible amount of heat.

Excessive heating can be prevented by keeping rooms properly shaded in hot weather. Rooms protected against the heat of outdoors should be thoroughly aired during the early morning and during cool spells. At other times, the inside air can be best kept in motion by the use of fans, thus giving a greater feeling of comfort to the occupants of rooms. The shading, however, should be of such a nature that not too much artificial light is required, as this may in turn become a means of increasing the inside temperature.

One of the most important rooms in the home as far as the housewife is concerned is the kitchen. Therefore care should be exercised in planning so that it is roomy and airy, receiving the maximum amount of ventilation and not unduly exposed to the sun's rays.

Working Conditions

Work in the form of muscular or mental activity is associated with the formation of heat in the body. It is evident, therefore, that when work must be performed the surrounding conditions should vary with the prevailing temperature, and should be correlated with the aids to work, such as eating, drinking, rest, and recreation. Effective heat regulation becomes most difficult when the surrounding temperature is high. Under such conditions air movement is highly essential.

Dr. Leonard Hill and Dr. Campbell, recognised authorities on ventilation problems in relation to health, state:—"The indoor conditions of many shops, offices, business houses, and factories in Great Britain closely approximate to the outdoor conditions which pertain to such climates as Madras and Sierra Leone, a climate which is recognised to be enervating to white men. The stillness of the air in confined spaces has a most potent influence on the cooling functions of the skin, on the cutaneous nerves, and so on vigour, health, and efficiency. The results of bad ventilation are not due to supposed chemical poisons in the air, but to heat stagnation, the symptoms felt in crowded rooms—oppression, headache, sickness, and faintness—resembling those experienced out of doors on excessively hot, humid days."

When air movement cannot be provided or when the required air currents become uncomfortable it is necessary to provide some protection against excessive heat. Outdoors much can be accomplished by proper shading against the heat rays of the sun. In places where high temperatures are required to carry on manufacturing process much can be accomplished by providing mehanical means for conducting the heat created in such establishments to the outside air.

Clothing

Clothing should be comfortable, and should hang loosely. When warmed, air tends to rise, so that the air next the body rises and escapes around the neck and wrists. If the openings here are free and sufficient then the cooling of the body in hot weather occurs more readily. The clothing should be of such material as to allow free evaporation, becoming to the least degree wet with sweat, and not clinging to the skin when wet.

Colour is important in that light shades throw off the sun's rays instead of absorbing them, as do dark colours. There is also a psychological effect in light, cool colours that adds not a little to the comfort of wearing these clothes in hot weather.

It should be remembered that although sunlight is one of Nature's most beneficient agents, injudicious exposure to the sun may be not only harmful but actually dangerous. A healthily-tanned skin cannot be acquired in a few days, and sea bathers should refrain from too sudden and reckless exposure of the body on hot beaches. Adequate rest taken during extreme heat is beneficial, while prolonged strenuous exercise under such conditions may give rise to excessive bodily fatigue.

Food

The food should be such that, while supplying sufficient nourishment, it produces a minimum of heat. The rule in hot weather is to eat moderately and lightly. During hot weather everybody needs much more fluid because of the water necessary for evaporation from the skin. The water consumption should be increased during the summer unless medically advised otherwise.

Bathing and cool showers help to reduce weariness and add to our comfort and energy. Sometimes a tepid bath just before retiring is soothing and quieting. To avoid excessive fatigue, it is essential that the proper amount of sleep and rest should be secured.

It is important to keep emotional poise during the hot weather season, and this is often acquired by keeping mentally occupied so that there is no time to worry about the heat.

Sunbathing Makes You Healthy; But Don't Overdo It

I wish I had a sun-baked hill,
Where I could go and lie for days,
And never think or do a thing,
And soak up ultra-violet rays.
—"The Cheerful Cherub."

THE sun has been regarded from earliest times as being the source of health, life, and fertility. Ancient civilisations, such as the Aztecs, have worshipped the sun. The Father of Medicine built a temple to the sun two thousand years ago and utilised its healing properties, the reason for which was then, of course, entirely unknown.

Modern scientists have discovered in sunlight certain invisible rays which make up what is known as "ultra-violet light." These rays have been definitely proved to cure bone tuberculosis, to relieve the disease known as rickets, and to promote good health generally. A bath in the sun is therefore beneficial to the well-being of the average person who does not suffer from any particular complaint, and there is no doubt that the sun bath, like the air bath, should be more generally employed as a hygienic measure.

Methods of Sunbathing

In taking sun-baths, however, common sense must be exercised. The person who has been shut up indoors all winter and then suddenly takes a day off at the beach, where he lolls about for six hours in a broiling sun, will not enjoy the soothing effects of the ultra-violet rays. Instead, he might just as well have roasted himself on a spit before an open fire and saved himself a trip.

It is most important that treatment should be gradual, or otherwise distressing results may arise that may even be a danger to life. The head should be covered, and the eyes and back of the neck should be protected. Blonde and fair-haired people, as a rule, show greater sensitiveness to sunlight, and the slightest over-exposure may react unfavourably, producing headache, fever, and malaise. Both the front of the naked body and the back should be exposed not more than five minutes the first day, until an hour or more is reached with the progressive bronzing of the skin. With children, the first exposure should be three minutes and then increased daily. The general effect is manifested by increased healthiness, usually in proportion to bronzing.

Vegetable oil is good to rub into sensitive skins before sun-bathing on the beaches. Exposure to intense heat should be avoided, and this applies particularly to little children. The best hours for sun-bathing are before 11 a.m. and after 3 p.m. No person in poor health should undertake sun-bathing without first consulting a physician. Prolonged exposure to bright sunshine in those not accustomed to its rays may be very harmful.

Bearing these cautions in mind, the daily exposure of as much as possible of the surface of the body to the direct rays of the sun—not, of course, to the point of blistering or extreme sunburn—is a health-giving measure which should be more widely employed.

Ultra Violet Rays

The ultra-violet rays, which are invisible, make up only about 1 per cent. of all the solar radiation. They are easily absorbed by dust, smoke, and moisture. This means that a dirty, smoky city is preventing its inhabitants from enjoying Nature's most precious of medicines. Other conditions being equal, life lived in the open air and sunshine makes stronger men and women than life lived indoors.

All of us need sunshine and fresh air as well as food. Good food we must buy, fresh air and sunshine in this country Nature has abundantly provided. Let us use them that life may be fuller and healthier.

Book Review

"The Plant Diseases of Great Britain"

WE have received a copy of the book entitled "The Plant Diseases of Great Britain." This volume is a bibliography, and as such is a useful work of reference for those who are connected with the identification of plant diseases and their control.

The literature of plant pathology is now so extensive and growing so rapidly that to review the published work relating to the diseases of even a single country requires a book which is, of necessity, unwieldy and difficult to keep up to date. It is, however, to the original literature that constant reference must be made for detailed information of any disease, and this bibliography is an attempt to collect together in a convenient form the key references for the principal plant diseases of Great Britain so that descriptions of the symptoms, the casual agents, and methods of control may be quickly found and additional information discovered.

The book is compiled and annotated by G. C. Ainsworth, B.Sc., Ph. D., Experimental and Research Station, Cheshunt, Herts, England, and is published by Chapman and Hall, Ltd., London. The price is 15s.

THE Good Neighbour

BY "MARY"

FROM ME TO YOU.

HAVE you ever, in your wanderings through your books, found the old Hindu saying which goes like this: "Yesterday is but a dream of what we have done in the past . . . and to-morrow is only a vision of what we might do and can do . . . Look well, therefore, unto THIS day." For it is what you do to-day that shapes to-morrow for you.

Have you ever wondered on that most precious of all possessions —time? Time—it is your share of eternity; every minute of every 24 hours in every day is a possession unto oneself—what do you do with your time? Do you feel, when you come to the end of the day's toil that you have done well? Are you one of the world's busy people, one of the world's cheerful people? Because it is the busiest people who are the happiest—and the happiest people are the ones who accomplish many things. And the secret of successful accomplishment is to spend time as though it were gold, passing from you for ever once it has slipped through your hands. Time will not turn back, time will not stand still. An hour passed is an hour lost for ever:

"Lost, somewhere between sunrise and sunset, one golden hour, studded with sixty diamond minutes. No reward offered, for it is gone for ever."

Live as if you only had to-day—no one knows just how long their share of time will last. Plan your days carefully, so there is time for work, and time for play. Don't waste minutes—they make hours.

Yes, there is time always to do those things we want to do most—I have found that out because of your many letters that have found their way into my mail. It is a delight to me to share in your doings, a happiness to know you all as my friends. For my time is your time, and I am always ready to share it with you.

Mary

I MET NOEL COWARD

YES, I really met him, this famous actor-playwright who has recently concluded a tour of New Zealand. Like you, I had seen photographs and heard him over the air, but this had not prepared me for the strength of his most outstanding characteristic—his vital personality. His is the deep cultured voice of the Englishman, his too the gift of easy, fluent conversation.

Picture him as I found him: younger looking than his photos, dark-haired, and his skin very tan, dressed in double-breasted navy suit which had the unmistakable cut of a London tailor, with two red carnations in his button-hole, and wearing, of course, his blue-and-white spotted bow tie—no, it is not "swank," this tie of his—it is a part of the personality of this amazing man.

Noel Coward's deep love for his country, and his great desire to serve it in these days of strife, have been evidenced in his talks, and it is obvious on meeting him how sincere and deep-rooted is this patriotism of his.

I wish we had television so that every one of you could see him as you have heard him at the patriotic concerts he has given, for undoubtedly it is the force of his dynamic personality —his acting powers, his happy air of comradeship, his little, inimitable mannerisms—that make him what he is—a man respected and admired the wide world over.

St. Valentine's Day

DID anyone send you a Valentine this year on February 14th? I very much doubt it, for this is a custom which has died out almost completely in these modern days. And a pity it is, too, for what a thrill even our modern miss would have if she received one of these quaint old-fashioned cards from an unknown admirer.

The festival of St. Valentine's Day goes gack to the Romans, when they held a feast in honour of Pan and Juno Februalis early in the month we now call February. Christian missionaries to Rome brought back tales of this custom to England, and so we find, in the villages on St. Valentine's Day, all the young maidens and young men joining in the feasting and fun. The names of the maidens were drawn by the young men, and this was his "Valentine" for the year. And, at the end of the year, was she still his Valentine? I wonder.

After many years, the custom died, and was revived by the man sending a gift to the lady of his choice. Sometimes these gifts took the form of jewels, priceless beyond telling, and so it was perhaps that some poorer swain hit on the idea of sending a card to his lady love on this day of all days Even then, a Valentine card was an expense, for some I have seen—curios now no doubt—have been perfect examples of needlework, embroidered with rich silks, and soft lace-edged cards, too, were popular.

So it is today, the name "St. Valentine's Day" suggests to us only those maidens of the Victorian age, with their ringlets and quiet grace and dignity, who blushed secretly over their Valentines and kept them among their most treasured possessions. St. Valentine's Day—it has gone from us for ever. No longer does the lover send to his lass declarations of his ardour in the form of sweetly sentimental verses on embroidered cards; no longer does Cupid fly through hearts and roses on this day. But perhaps it is as well, for the old custom, in dying, has lost none of its romance—rather, there is about it today a fragrant aura, delicate and exquisite, which keeps this festival of hearts so very much in the golden past, where it most truly belongs.

"... Only Skin Deep"

Are You Proud of Your Hair?

HOW are the shining lights in your hair these days? Is your hair glossy and smooth, or has it become bleached by the sun of summertime? Because these are the days when you must look after your crowning glory,

Soft, deep waves with full pin curls and semi-rolls fashion this high-low hairstyle created by Helen Hunt for Rochelle Hudson, featured by Columbia. The hair is swept in soft waves off the temples, and above each ear breaks into full curls. The same treatment is done on the forehead, where a full roll is noted. Roll curls finish off the well controlled contour at the nape of the neck.

for the heat of summer is inclined to dry out the natural oils and leave the hair wiry instead of soft.

Out with your hairbrush then, begin each day by a daily brushing, and finish each day this way too. Your hair cannot be brushed too much, ever. And brushing tones up the scalp, makes the circulation flow freely, and so enhances the beauty of your hair.

When washing your hair, do not forget to massage your scalp well the night before with warm olive or coconut oil. Rub the warm oil well into the roots of the hair with the fingertips, and wind a cloth turban-wise round your head before retiring to protect your pillowslip. Always use a good shampoo for your hair, one to suit your own colouring if you are brunette or blonde. Use a double soaping, and several rinses, with lemon juice in the last one. Now out into the sunshine, rub and toss your hair till half dry, and then set with combs and curlers.

Don't overlook the value of a good setting lotion—it is invaluable if your perm. is becoming a little tired. Incidentally, have you ever tried applying your setting lotion by using a talc tin? The lotion goes on evenly, and you use considerably less this way.

Here is a good way to set your hair, if you want to go out in a hurry, and wish to look your best. Set your hair in the usual way with combs and curlers, but set it **dry**—do not damp it at all. Put a net on, then, protecting the face with a towel, hold your head over a gently-steaming kettle of boiling water for a few minutes. Press the waves into place, and dry with a fan. This only takes a very short time, and you will be surprised at the result.

Remember, it is only with constant care and brushing that you will be rewarded with a shining head of hair. It is no use brushing your hair every day for a week and expecting miraculous results almost overnight. As with all beauty treatments, it is persistency that brings the best results, and five minutes spent every day on brushing your curls is worth an hour spent only one day a week.

And in these days when so many girls are joining the ranks of the hatless, attention is focused on the hair—will yours stand the test?

To My Love.

You gave me a gift of friendship
Pure and sweet as a flower;
You brought me a summer's sunshine
Enshrined in one deep hour.
You laughed, and my heart was happy,
You frowned, and my day was blue,
Because the sun that lights my world
Is you, my love, just you.

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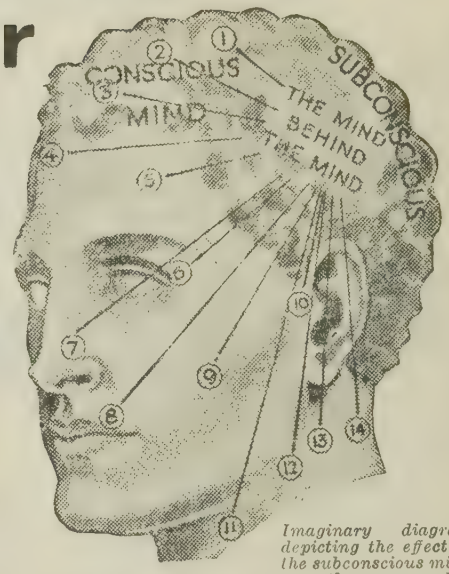

Imaginary diagram depicting the effect of the subconscious mind on the personality and bodily structure.

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Only the self-conscious and nervous really realise the full tragedy of their affliction—the doubts and fears, the self-criticism, the friendlessness, the hours of brooding over "what other people think of me," the regrets for opportunities lost, the bitter pain of seeing lesser men and women pass them in the race of life. Yet such men and women, directed in the right way, have the power to win heights that dull, phlegmatic natures could never reach. An inferiority complex is a disturbance in subconsciousness, a source of powerful negative impulses which manifest themselves in various personality-weaknesses such as deprive you of happy, carefree social joys—prevent you from progressing in your chosen business calling—depress you with anxieties, fears and other groundless worries—render you ill at ease in the presence of superiors or shy and tongue-tied with the opposite sex—weaken your memory—ruin your married harmony—cause mind-wandering, inability to concentrate or to make decisions—weaken your will power and subject you to the tyranny of habits—overwhelm you with "stage-fright"—make you sick with nervous apprehension at the prospect of an important interview.

1. Self-consciousness. Lack of Self-confidence.
2. Over-anxiety. Nervous apprehension.
3. Depression. Worry. Sleeplessness. Brain-fag.
4. Weakness of will. Indecision. Habits.
5. Forgetfulness. Lack of concentration.
4. Unsteady gaze. Shifting eyes.
7. Nervous catarrh.
8. Stammering.
9. Blushing.
10. Word obsessions.
11. Hot hands. Trembling limbs.
12. Neurasthenia. Nerve pains.
13. Indigestion and other functional disorders.
14. Physical lethargy.

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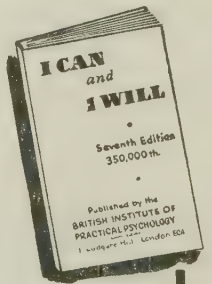

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Silk Stockings Are Precious Now

YES, silk stockings are precious these days—they are up in price, and hard to obtain even then. So look after your good pairs well; they may have to serve you for a long period. When you first buy them, soak them before wearing in a basin of cold water, to which has been added a tablespoonful of salt. Leave them for a few hours, squeeze, and hang them to dry in the shade. When perfectly dry, rinse them in clean water, and their life will be doubled.

Have you ever tried this method of making cheap, shiny artificial stockings dull? They look expensive with a dull sheen. Mix together a quarter-ounce of dissolved soap, and four ounces of fuller's earth or french chalk in a quart of warm water. Immerse the stockings well in this solution, squeeze gently, and shake them well before hanging in the shade.

If you put a few drops of methylated spirits in the water when you are washing your stockings, the heaviest shower won't spot them. And if you are unlucky enough to spill grease on them, rub the spot gently, while the stocking is still on your leg, with a piece of cotton-wool soaked in eucalyptus. There is no trace of grease when the spot has dried.

Have you ever realised that many ladders are caused through letting your stockings twist round and round the line on washing day, when it is windy? Try clipping one of those spring clothes-pegs on to the toe of each stocking, before you hang them on the line, and the weight will keep them from twisting.

And, talking of stockings, have you seen or used the new liquid hosiery? I have experimented with it, and it is impossible to tell it, when properly applied, from the sheerest silk. If you have someone in the house with a very straight eye, an eyebrow pencil run down the back of the leg forms a perfect seam, and there you have a stocking which will not ladder, will not wrinkle, or spot in the rain! Quite a number of lasses in city streets and trams are sporting "liquid" stockings, and on these hot days what more could you ask for? But I think when winter comes along the liquid stockings will go into the drawer and it will be grate-stockings again.

Cash Prizes for What You Think!

VISITORS from overseas marvel always at the manner in which New Zealand women run their homes—how they attend to the needs of their families, do their own housework and cooking, fulfill their social engagements, and while doing so always manage to be cheerful, and at the beck and call of the family. But there is the other side of the picture:

"Do New Zealand women keep up appearances at considerable cost to themselves?"

For it is an effort, this keeping up appearances, and the strain must tell, sooner or later. Do you think their health suffers to any great extent—do they shorten their life by doing so much all the time?

Let me know your ideas before the 15th March—it is original ideas I want, so don't worry if you can't write too well.

Two prizes will be awarded: First 10/-, and second 5/-. Out with your pens and paper, and send your opinions to me:

"Mary"

Closing date: 15th March, 1941. C/o. "Journal of Agriculture," P.O. Box 3004, WELLINGTON.

Helpful Hannah Says . . .

To prevent cakes sticking when cooked, warm the tins slightly before pouring in the mixture.

* * *

Try boiling your leg of mutton for half an hour before baking it. You will find it much juicier this way, and it doesn't shrink so much.

* * *

Your linoleum will last much longer, and keep brighter, if you wash it with warm water to which a little kerosene has been added.

* * *

When drying your cardigan, lay it between newspapers, and put it under a mat for a day or so. You will be surprised at how new it looks if dried this way.

* * *

When the weather is damp, insert a wooden match in your salt shaker—the salt then pours quite easily.

* * *

Try using a cake of hard soap for your pincushion—the pins and needles won't then rust.

Short Story

FOR TWENTY-EIGHT YEARS

FRIDAY, being baking day at "Maranui," was always a hard day for the womenfolk. On this particular Friday they were busier than ever. Emma's Joe was to spend the week-end with them, and Emma was always fussy. Such energy seemed futile to Maud and the boys, but Dad only grinned and looked wise! He said Em was her mother, all over again. Em always got in the same argument at this stage. She said, if he'd considered Mum old enough at twenty-two to marry him . . .

But just there Dad always faded away quietly. He didn't like arguments with women; they always beat him in the end if he stayed long enough.

The wide verandah at "Maranui," pleasantly cool on these late January evenings, was the favourite rallying ground of the family when the day's work was done. Dad, lazily drawing at his pipe, looked across the garden with appreciative eyes at "Maranui"—all his. And Sid, from his seat on the top step, looked away over the paddocks, beyond the farm, and he too had his thoughts. If only they could spare him for just a day—he hadn't been to Wellington for months—and tomorrow's match would be well worth seeing. Perhaps he'd better broach the subject now, while Dad seemed in a good mood!

In the kitchen Mum bent rather wearily over the stove as she replenished the fire. It was nearly supper time—if only Maud would hurry over setting the table. But Em's voice, as she came in from the dairy, stirred Maud into a final spurt.

"Come on, Miss Lazybones; eight o'clock, and supper not ready! You know Dad hates being kept waiting. D'you think, Mum, I'll be spoiling Joe like that?"

Mum laughed.

"Of course, you will, my girl! For twenty-eight years—barring times of sickness—I've had your father's meal on the table on the tick of time."

"You seem to glory in spoiling him," broke in Em. "But, seriously Mum, what about—it? Joe won't wait for ever—and he's sure to say something about it again tomorrow."

Mrs. Bunton sighed.

"Of course, Em, I know it seems hard waiting, but Maudie's coming along fine now—I'm sure it won't be long now. Hullo—here's your father. Come on, Maudie, set the chair for Dad; quick my girl!"

Dad's face was set in his usual determined fashion as he strode into the kitchen, followed rather sheepishly by Sid.

"Well, Ma, have you heard Sid's latest idea?" Dad's voice sounded grim, but there was just a hint of a twinkle in his eye as the family seated themselves round the table. "Wants another day off to go gallivanting round the city. Perhaps there's some attraction down there—eh, Sid?"

Rita Hayworth, Columbia starlet, wears this attractive frock for summer months. Modelled in cool white linen, it is the perfect mate for the glorious summer days we are having. It is made with pencil slim skirt, and two patch pockets on the bodice. The neckline, pockets and belt are edged with scarlet suede fabric.

Sid's sunburnt face seemed to take on a deeper tint, but he stuck to his guns manfully.

"Can't see anything very comical in having a Saturday in town occasionally," he answered steadily.

Dad laughed. His ruminations on the verandah had left him with a pleasant feeling of benevolence. He looked at Mrs. Bunton.

"Well, Ma, what about it? You shall have the casting vote this time—shall Sid go or not?"

"Well, I was thinking, Dad—only just thinking of it, you know—but it would be kind of nice——"

Maudie nudged Em and giggled.

"Sid always was Mother's white-haired boy. I bet you she gives him her cream money that she was saving for a new frock so he'll have some extra pocket money——"

Dad's look silenced Maud, then he nodded to Mum to finish.

Mum seemed rather flustered, but she grasped the bread knife and went on.

"Of course Sid can go. But while we are on the subject, I'd just like to say something I've been thinking about for a goodish time. As they are growing up so rapidly, with Em here able to take my place for a while, and Sid able to keep things going for you, why can't we manage a day in town together?"

Silence reigned for a moment, then Dad said slowly, as he looked at Mum:

"D'you mean me and you—go down to Wellington? Why, you're silly, Ma! We haven't had a day away together for the twenty-eight years we've been——"

Em broke in rather sharply.

"Then it's high time you did! We can manage here. It's a good idea, And Mum can buy the new dress she wants at the same time."

Mother looked wistfully at Dad, and laid down the bread knife, as though she no longer needed its protection.

"Of course, it was only an idea of mine. I've been thinking lately about that day we had together in Wellington after we were married—Jim! Remember the beautiful flowers in the

Botanical Gardens, the lovely dresses on the girls, and the pretty sunshades on the beaches. I've been thinking of it all, Jim. I'd like to go——"

Dad's chair made a harsh, scraping sound on the floor as he rose rather slowly, at the same time fumbling in his pocket for his old brown pipe. His look at Mum was almost as shy as anything Sid could muster.

"Then that settles it. We'll go on Monday. And I'll help you choose your dress—Mary!"

The family stared! Things were serious when Mum and Dad took to calling each other by Christian names.

. . . . . .

Mum could hardly wait for Monday to come. There was a rush to get away in time to catch the train in the morning, but oh! when they arrived at the Wellington Railway Station! As they stood hesitatingly on the platform Dad looked down at Mum with a grin.

"Well, old girl, where shall it be first of all?"

"Oh, shops—and then, let's catch a bus and go to Day's Bay. Remember? You took me there before."

So they went round the shops. Oh, those windows! Those intriguing little hat shops and frock shops, with monogrammed velvet curtains, and tall, golden-haired young goddesses in trailing gowns! And in the big stores they walked between rolls of brightly-coloured materials, ribbons, hankies, ladies' underwear—Dad rather unconsciously quickened his footsteps here till a tall correct shopwalker politely directed them to the dress department. Dad wore an air of martyrdom as he followed their guide, but a keen observer would have noticed that Mum's face was set and resolved; her chin looked the tiniest bit defiant.

. . . . . .

About 8 o'clock that night the kitchen at "Maranui" had completely lost its customary air of tidiness and repose. Mum's hat—her best one, too—was hung on the back of a chair; Maudie stooped industriously over the table, untying the knots of the pile of brown paper parcels which lay scattered over its surface. The boys were late with the milking, and Dad had gone over to give them a hand, but they would all be in any minute now. Regardless of that fact, however, Mum and Em nervously got in each other's way, as they both tried to be the first to undo a large white box. The girls knew it contained the frock, though secretly they both thought Mum had been a trifle extravagant. At last the box was opened, and fold upon fold of filmy tissue was carefully lifted out. Em gave a gasp—and Maudie left her parcels, and peered excitedly in at the dress. In tense silence Mum lifted it gently—a soft, white, gleaming thing, with touches of silver and orange blossom and lace. She gave a queer, excited little laugh as she held it up towards Em.

"Yours, my dear," she whispered. "Your wedding frock! I couldn't help it, Em—as soon as I saw all the pretty things, I knew then how much you were missing. Dad's pleased, too! He says it's all right."

Maudie took the frock reverently from her mother, and looked with shining eyes at the dainty sheen of it. But Em threw herself into her mother's arms!

"Mother, you d-darling!" she sobbed.

Mum recovered first. Half-laughing, half-crying, she pushed Em gently

Accent in gold against a lemon-coloured background, with satin and sequins the medium, Irene the designer, and Jean Arthur the sponsor, will be seen in "Too Many Husbands," directed by Wesley Ruggles for Columbia.

away, and drew their attention to the other parcels—presents for them all, and fragile white shoes and stockings for the bride.

"And, see here," she said softly, as she opened the last parcel. "Dad was determined I should have my frock after all. It . . . it will be just right for the wedding. I have always wanted a blue frock!"

In the sitting-room the clock struck sharply. A sound of heavy boots came to them from the front verandah—Dad and the boys were home!

Mother flew to the table in alarm. "Girls, girls, quick!" she cried. "Help me clear these away. Dear, dear! It's 8 o'clock, and your father's home, and there's no supper ready! Whatever can I have been thinking of!"

Maudie flew to her mother's bidding, but Em only smiled, and tenderly folded her wedding dress.

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While the Log Burns . . .

A Book You Will Enjoy

HAVE you read "White Banners?" If not, try and get it from your library—it is by the American writer Lloyd Douglas and is most interesting and absorbing.

"White Banners" is the story of Hannah Parmalee, who comes in out of a storm one day to help the Ward family. For 25 years she lives with this family, and during that period, naturally, everything happens that happens to most families. There is romance, tragedy, sorrow, and happiness running through its pages, and, although you too will love the people who live therein, I am sure you will never forget Hannah and her strange theory of not fighting back when Fate struck cruel blows at her and her loved ones. Hannah's theory is indeed an interesting one—perhaps it is best explained in her own words.

"When the people of one tribe had worn out their soil, fished out their streams, and frightened away the game, they could do one of two things—make war on a neighbouring prosperous tribe, or migrate to a new locality. The usual thing was to make war. If victorious, they captured the land, and enslaved the people. The slaves were forced to do the work, while their new masters grew fat, lazy, and stupid. History was uncertain about many things, but quite sure on this point: to acquire property by capture endangered the life of the victors. The possession of anything you hadn't earned was a constant menace."

The last sentence—"The possession of anything you hadn't earned was a constant menace"—is almost the keynote of the book. Hannah believed that she was richer through every disappointment. When Fate struck cruel blows at her theory, she just smiled back, and carried on. And, strangely, you will agree, she was at peace in her carrying on. It wasn't a mere surrender she made made—it was something positive. It was an accretion to her character and courage.

It is really the story of Hannah's life, telling one of the happy days of her youth, a tragic love affair, followed later by an unhappy marriage, and then traces the fortunes of the family to whom she is housekeeper. There is not a dull line in the whole book, and the interest is intense right to the last. Hannah gains converts to her strange theory, and proves to them how it works out.

"You make a resolution that when people revile you, and persecute you, and defraud you, you'll simply smile back, and take it on the chin—and make that the fixed rule of your life. And refuse to quarrel and fight, no matter what they do to you. If you want to know anything more about it than I've told you, you may have to discover it for yourself. But when you do discover it, something will happen to you that you're not looking for. I can tell you that much. And you'll be surprised! It is like acquiring a sixth sense."

Hannah's courage was not the sort that displayed itself with bands playing and flags flying. It was a private courage that no one knew of. But it was an undoubted possession, and her courage earned for her white banners for private valour.

In the present days of strife among all peoples, it is particularly interesting to come across a book such as this one. It makes one wonder just what sort of a place the world would be if everyone carried out Hannah's theory as Hannah herself did. It is impossible to forget the people you meet within this book; impossible, ever, to forget the warm-hearted, generous Hannah, who was strong enough to achieve her victories without strife.

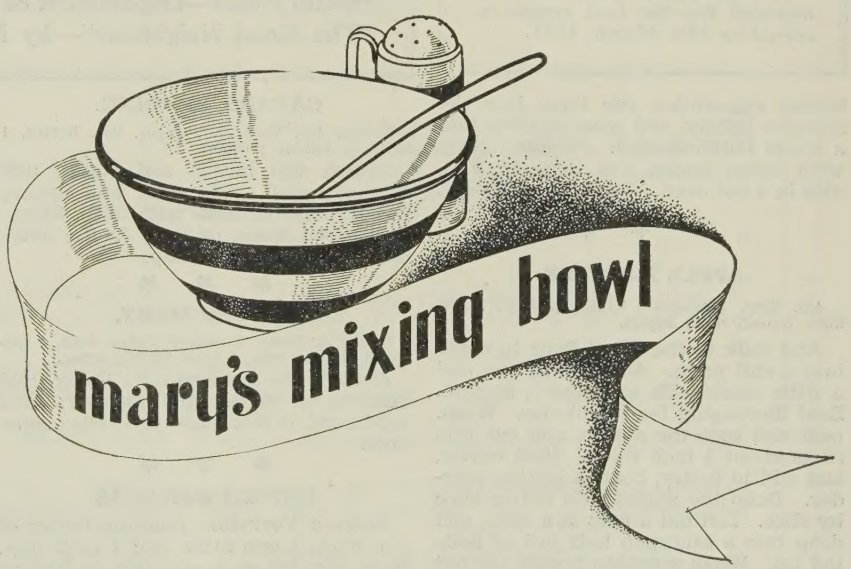
If you are losing faith in the world, or in yourself, find a copy of "White Banners," and then see just how long it is before you find that you too have acquired the habit of running up "white banners of courage" over your own struggles and victories. You will not soon, or easily, forget this book.

Little Things.

I have loved the joy of little, homely things—
The gift of sweet companionship; deep fires;
A kettle on the hob; rain on the roof;
And a small one's chattering that never tires.

I have found delight in little, homely things—
The making of fresh sponges, soft and light;
The sweeping of a carpet; shining silver,
Or polishing of brass, all glowing bright.

Dear God, I pray that down the years
These little homely things will be
The lovely, lasting joys of life
That make each day a jewel for me.



MARMALADE

2lb. grapefruit, 5 large cups water.

Cut the grapefruit finely, and leave overnight in the water. Next day bring to the boil with 3 lb. sugar. Cook slowly till it sets—about 1 hour.

* * *

PEANUT COOKIES

3oz. flour, ½ teaspoon baking powder, 1 heaped teaspoon cocoa, 2oz. butter, 2oz. sugar, 1 egg, ½lb. peanuts.

Beat the butter and sugar to a cream, add beaten egg, and then sifted dry ingredients, lastly the nuts. Place on a cold greased tray, and bake in a moderate oven for 20 minutes.

* * *

KISSES.

2 tablespoons butter, ¼ cup cornflour, ¾ cup flour, 2 eggs, 1 heaped teaspoon baking powder, ½ cup sugar, vanilla essence.

Cream the butter and sugar, add eggs well beaten, then dry ingredients. Place in teaspoonfuls on a greased tin, and bake a light brown. When cooked put two halves together with raspberry jam.

PIKELETS

2 cups flour, 2 eggs, 3 tablespoons sugar, 1 cup milk, 3 heaped teaspoons baking powder.

Beat eggs and sugar, add the milk, and lastly the dry ingredients. Drop in teaspoonfuls on hot greased girdle, turn when bubbles break on top, and then pile in tea-towel to keep moist.

* * *

LEMON PUFF

Stir a little more than ½ cup flour with ½ cup of milk until smooth. Thoroughly beat four egg-yolks, add slowly ½ cup sugar and the juice of one large lemon, mix the eggs with the paste, and beat well. Have ready the stiffly beaten egg-whites, stir them into the mixture lightly, and pour at once into a warm buttered dish. Dredge lightly with castor sugar, and bake 15 minutes in a hot oven. Serve immediately.

* * *

That Dry Bread

What do you do with your bread when it goes stale on you? So often this happens, especially in these warmer days when bread is not so popular on the menu as the cooler foods of summer.

Send your best recipe for using stale bread to the "Mixing Bowl."

A cash prize of 2/6 will be awarded for the best recipe received by 15th March, 1941.

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APPLE FRITTERS.

4oz. flour, ½ teaspoon baking powder, 1 egg, little butter, milk, apples.

Add milk to the sifted flour to make into a stiff paste. Add beaten egg and a little more milk to make it smooth. Beat thoroughly for 10 minutes. Wash, peel and core the apples, and cut into rings about ½ inch thick. Melt butter, and add to batter, beat in baking powder. Drop the apples into batter slice by slice. Lift out a ring at a time, and drop into a saucepan half full of boiling fat. When a golden brown lift out on to crumpled paper to drain. Serve hot, with icing sugar sprinkled over them.

* * *

CASHMERE CHUTNEY

3lb. ripe peaches, 1½lb. brown sugar, 1lb. dates, 1lb. raisins, ½lb. preserved ginger, ½oz. garlic, 2oz. salt, 1 teaspoon cayenne pepper.

Bring the peaches and garlic to the boil in enough vinegar to cover, then add other ingredients, and boil half an hour. This is an Indian chutney.

CANARY PUDDING.

1 egg, 4oz. flour, 3oz. sugar, 2oz. butter, 1 teaspoon baking powder.

Cream the butter and sugar, add beaten eggs. Add flour and baking powder, and moisten with milk. Steam in greased basin, or bake in the oven. Serve with golden syrup.

* * *

CLEVER MARY.

1 cake sandsoap, 2 packets flaked soap, 1 teaspoon caustic soda, 6 cups boiling water.

Crunch the sandsoap up finely, and dissolve all ingredients together. Stir well until it thickens—this takes some time.

* * *

HIDDEN BANANAS

Make a Yorkshire pudding batter of ¼lb. flour, 1 cup milk, and 1 or 2 eggs. Heat 2oz. fat in a pie dish or baking dish. Split 2 bananas into quarters, roll them in sugar. Pour the batter into the hot fat, slip the bananas into the batter, and bake for 30 minutes in a hot oven. Serve with castor sugar, and lemon quarters.

* * *

ONE-EGG CAKE.

1lb. flour, ½lb. butter, ½lb. sugar, 1lb. mixed fruit, level teaspoon soda, 2 teaspoons vinegar, 1 egg, 1 cup milk.

Cream the butter and sugar, add egg, beat well, add vinegar, then the milk with soda dissolved in it, flour, and fruit. Bake two hours.

* * *

FRUIT SPONGE.

2oz. sugar, 2oz. butter, 2oz. flour, 1 egg, little milk, ½ teaspoon baking powder, pinch of salt, stewed fruit, well drained.

Cream the butter and sugar, add sifted flour and baking powder, and salt alternately with beaten egg and milk (if needed). Put drained fruit in the bottom of a buttered pie dish, and pour sponge over. Bake in a moderate to slow oven for 40 minutes.

* * *

BACON AND EGG PIE.

½lb. butter, 1 cup flour, salt, little lemon juice.

Line the dish with pastry, spread with bacon, and break in one egg for each person, add chopped parsley and lemon juice, and cover with pastry.

* * *

LEMON CHEESE.

Juice and grated rind of 1 lemon, 1 egg, 3oz. butter, 6oz. sugar.

Put butter, sugar, and lemon juice into a saucepan and stir until sugar melts, add egg, stir until thickens, but do not boil. Add rind of lemon, and then bottle.

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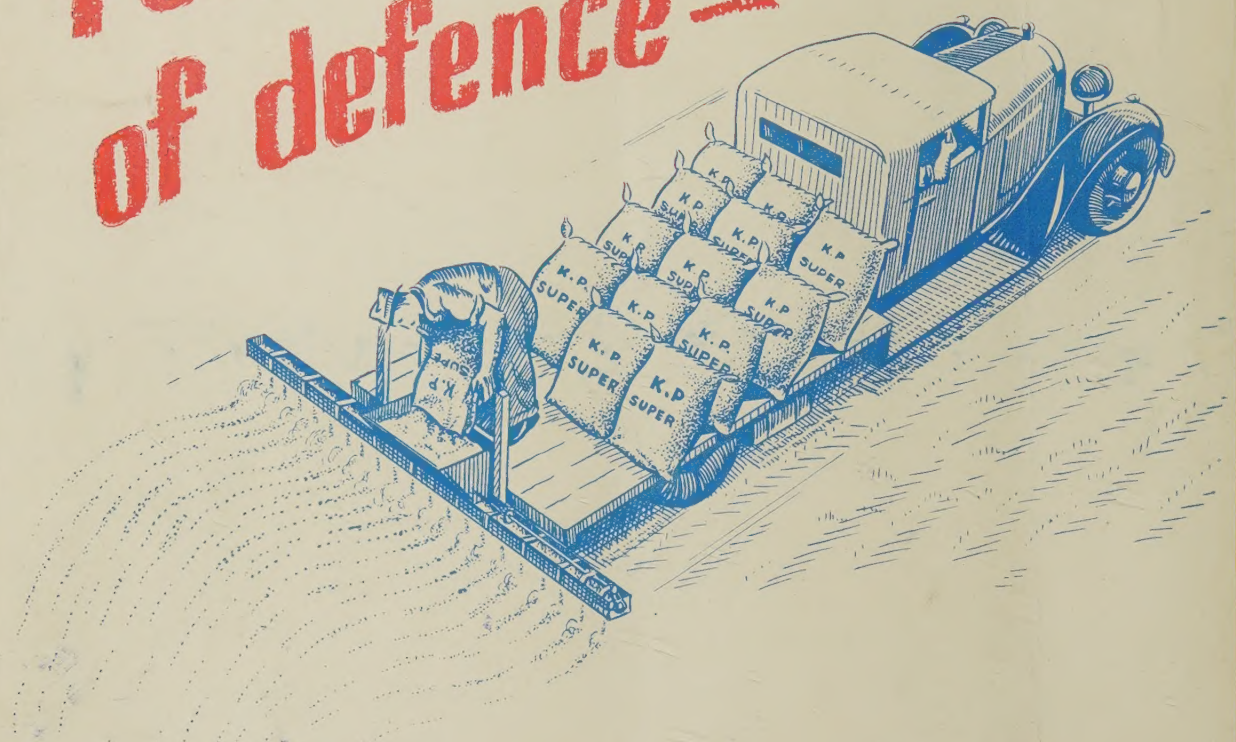

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